THE AMERICAN
JOURNAL OF PHARMACY.

DECEMBER, 1883.

SYRUP OF LACTUCARIUM.

By Joseph W. England, Ph. G.

Read at the Pharmaceutical Meeting, November 20, 1883.

The preparation of this syrup, so as not only to secure in solution all the medicinally active constituents of the drug, but also to obtain a clear, transparent and uniform product, has hitherto been a matter of great difficulty and rare accomplishment; hence, any suggestions that may lead us out of the troublesome path certainly possess some elements of value.

The Pharmacopœia af 1870 ordered the extraction of the drug with dilute alcohol, and the mixture of the percolate, concentrated to one-fourth of its original volume, with a sufficient quantity of syrup to measure one pint. Prepared with the greatest care and skill, a muddy, turbid and unsightly mixture results. To obviate this difficulty various suggestions and propositions have been offered, these only to end, upon trial, in renewed failure. The employment of Finley's process in the manufacture of syrup of tolu in the application of magnesium carbonate, the use of citric acid or alkalies, the trituration of the concrete juice with pumice-stone, its agitation with petroleum benzin and after decantation rubbing with dry sand to a fine powder for preparatory treatment before the use of solvents—all these have received careful and conscientious use in its manufacture but failed to reward the sanguine hopes of their proposers.

Lactucarium is a mixture of certain common proximate vegetable principles and acids (oxalic, citric, malic) with lactucerin (50 per cent.), lactucin, lactucic acid and lactucopicrin. The first, lactucerin, has no physiological action whatever; the bitter and narcotic properties depend upon the three latter compounds.

In the new revised Pharmacopœia (1880) a different method of preparation is adopted. A fluid extract is made officinal and the syrup is prepared direct from it. In the process for the manufacture of the

fluid extract a great end is accomplished by the removal of the objectionable and inert lactucerin through its solubility in ether, which solvent when used leaves unaffected for further treatment the mass containing the active principles. But the U. S. P. process (1880) is at best a complicated, troublesome and imperfect formula, and a partially approximate result can only be obtained by its use, in consequence of the lactucarium being ordered "in coarse pieces" when first macerated with ether, and not properly disintegrated, as it should be in order to obtain the full action of the solvent on the drug. It therefore must necessarily leave undissolved a large quantity of lactucerin. The syrup made from it, accordingly, failed partially or wholly to fulfill original expectations, and clearly the whole subject needed further investigation in regard to its pharmaceutical preparations.

Following out the line of experiment already spoken of in the premises, the following formula was constructed, as the result of these investigations, and found to prove entirely satisfactory:

Formula.

Take of	Allen's lactucarium	1 troyounce.
	Powdered quartz	2 troyounces.
	Magnesium carbonate	2 drachms.
	Sugar, granulated	13 troyounces.
	Ether	1½ fluidounce.
	Glycerin	2 fluidounces.
	Alcohol dilute	
	Water	each, a sufficient quantity.

Reduce the lactucarium to a fine powder with the powdered quartz, macerate for several days with the ether, decant as much as possible of the etherial solution, add two fluidounces of water, and remove excess of ether by cautious evaporation. When this has been done add to this liquid glycerin two fluidounces, diluted alcohol eight fluidounces, sugar one troyounce, and magnesium carbonate two drachms.

Place in a tightly stoppered bottle or flask, digest in a water-bath, at a temperature not exceeding 130°F., for 12 hours. Displace in a glass funnel through absorbent cotton, evaporate the percolate down to 6 fluidounces, make up to 10 fluidounces with dilute alcohol, filter and add 12 troyounces of sugar to the filtrate, dissolving with the aid of heat. Lastly, add, when cold, enough syrup to make the finished product measure 1 pint.

Powdered quartz is used to reduce the concrete juice to a fine pow-

der. It cuts and disintegrates far better than sand or any similar siliceous substance, and thus presents the drug in a more fit condition for solvent treatment. The object of maceration with ether has been previously explained.

Lactucic acid and lactucopicrin are both freely soluble in water, and are obtained in solution when so treated. If not wholly dissolved, they are taken up in the further treatment of diluted alcohol and glycerin, which also dissolves lactucin, one of the bitter principles, but sparingly soluble in water alone.

The use of magnesium carbonate is to serve several purposes. It combines with any free acids present to render a neutral liquid, greatly lessens the excessive bitterness, and decidedly increases the activity of the solvents in the amount of the principles extracted. It, lastly, is valuable as a clarifying agent when displacement is in order.

The purpose of prolonged digestion is to secure perfect solution, and coagulation of all gum, resinous or albuminous matter present. The evaporation of the percolate down to 6 fluidounces is to prevent undue excess of alcohol in the liquid, while the last addition of diluted alcohol is to have the syrup definite in alcohol strength to insure preservation.

A sample of the improved syrup (U. S. P. strength) is presented. It is a clear, transparent reddish-brown syrupy liquid, almost black, having a strong, decidedly narcotic odor, similar to opium. It mixes, in all proportions, with water without diminishing its transparency, possesses a pleasantly bitter taste, free from acridity, and on continued exposure to air undergoes no decomposition, nor forms any fungoid growth upon its surface.

WEIGHT BY MEASURE.

By A. B. Lyons, M. D., Detroit, Michigan.

The U. S. Pharmacopœia has very wisely adopted the plan of expressing in all its formulæ the proportions of liquids as well as of solids in parts by weight. Many pharmacists will follow these formulæ literally, but the force of habit is strong, and English-speaking people generally are accustomed to measure rather than weigh liquids. Rather than change their usage in this respect, they will go through the laborious calculations necessary to translate the language of weights to that of volumes.

Aside, however, from this, it will be often necessary to bring into

comparison formulæ expressed in weights, and those in which volumes are employed, as at present in the British Pharmacopœia. A ready means of making such comparisons and translations, is an acknowledged desideratum. The Committee charged with the revision of the Pharmacopœia, found it impossible, in the limited time at their disposal to supply it. The table herewith furnished may serve temporarily to meet the want.

The table includes the more important officinal liquids, especially those frequently occurring in officinal and private formulæ. Its uses will be too obvious to require elucidation.

In computing the table I have assumed that all specific gravities are to be referred to water at its maximum density as a standard of comparison. The U. S. Pharmacopœia does not state that that standard is uniformly adopted, and it is evident in looking over its tables of specific gravities, that in some instances water at a temperature of 58° or 60° F. has been taken as the standard. This is notably the case in the very elaborate alcoholometric table given, after Hehner. In the existing confusion on this point, I have thought it best to accept, provisionally, the figures of the Pharmacopœia, referring them, except in the case of alcohol, to a single unit, and I have adopted that which is employed in the majority of the tables now in use, although personally, I am in favor, for practical purposes, of adopting as a standard water at the same temperature as that at which the weighing is made. No doubt a considerable number of the figures given in the Pharmacopœia have been actually obtained by the use of such a standard, and the corresponding values given in the table, are therefore subject to a correction, practically unimportant however, on this score. The figures relating to alcohol assume, exceptionally, as a standard water at 60°F.

Again I found some difficulty in deciding what figure to adopt for the weight of a pint of water at maximum density. The U. S. Pharmacopœia indeed gives a value, which perhaps in the formulæ of that work must be considered authoritative, but it is inconsistent with other values, which must equally be accepted as authoritative. It is impossible to reconcile the value given for a minim (0·0616 gram), with that for a pint (7291·2 grains at 60° F. or 7297·46 grains at maximum density). It is equally impossible to reconcile the values commonly given for the length of the metre in inches, and the weight of a cubic inch of water in grains with the fundamental ratio in the metric system of kilogramme to litre. With-

out attempting to reconcile these discrepancies, I have adopted as the weight of a gallon of water, the figure which Dr. Squibb fixed upon after a careful review of the whole subject in his alcoholometric tables, and which has at least a quasi legal authority. According to this value a fluidounce of water at its maximum density weighs 456·0325 grains; at a temperature of 60°F. its weight is 455·6417 grains.

LIQUIDS.	Spec. Grav. U. S. P.	Vol. of 1000 grams in litres.	Vol. of 100 oz. av. in fl. oz.	Vol. of 1000 gr. in fl. oz.	Vol. of 100 gr. in minims.	Wei'ht of one pint in grains.	Wei'ht of one fl. oz. in grains.	Wei'ht of one fl. oz. in oz. av.
Acid acetic	1·048	·9542	91·54	2·092	100·44	7626·7	477·92	1·0924
Acid acet. dil	1·0083	·9918	95·17	2·175	104·41	7357·1	459·82	1·0510
Acid hydrochloric	1·160	·8621	82·70	1·890	90·74	8465·0	529·00	1·2091
Acid hydrochloric, dil.	1·049	·9533	91·45	2·090	100·34	7654·0	478·38	1·0934
Acid lactic	1·212	·8254	79·18	1·810	86·87	8843·3	552·71	1·2633
Acid nitric	1·420	·7042	67·56	1·544	74·12	10361·1	647·57	1·4801
Acid nitric, dil.	1·059	·9443	90·59	2·071	99·39	7727·0	482·94	1·1039
Acid oleic	·800	1·2500	119·92	2·741	131·57	5887·2	364·83	·8339
Acid phosphoric	1·347	·7424	71·22	1·628	78·14	9828·4	614·28	1·4041
Acid phos., dil.	1·057	·9461	90·76	2·075	99·58	7712·4	482·03	1·1018
Acid sulphuric	1·840	·5435	52·14	1·192	57·19	13425·6	839·10	1·9179
Acid sulphuric, dil.	1·094	·9141	87·69	2·004	96·21	7982·4	498·90	1·1408
Æther	·750	1·3333	127·91	2·924	140·34	5472·4	342·03	·7818
Æther, stronger	·725	1·3793	132·33	3·025	145·18	5290·0	330·62	·7557
Alcohol (60°F.)*	·820	1·2205	117·09	2·676	128·47	5978·0	373·63	·8540
Alcohol (77°F.)*	·812	1·2325	118·24	2·703	129·73	5919·7	369·98	·8457
Alcohol, dil. (60°F.)*	·928	1·0785	103·47	2·365	113·52	6765·4	422·84	·9665
Alcohol, dil. (77°F.)*	·920	1·0879	104·37	2·386	114·51	6707.0	419·19	·9582
Aqua (60°F.)	·9991	1·00086	96·02	2·196	105·35	7290·3	455·642	1·0415
Aqua ammoniæ	·950	1·0428	100·04	2·287	109 76	6897·4	437·34	·9996
Aq. ammon. fort	·900	1·1111	106·60	2·436	116·95	6566·9	410·43	·9381
Benzin	·670	1·4925	143·24	3·273	157·10	4888·7	305·54	·6984
Chloroform (pure)	1·488	·6720	64·47	1·474	70·74	10857·2	678 58	1·5510
Glycerin	1·250	·8000	76·75	1·754	84·20	9120·7	570·04	1·3030
Liq. ferri chloridi	1·405	·7117	68·28	1·561	74·91	10251·6	640·73	1·4645
Liq. ferri tersulph	1·320	·7576	72·68	1·661	78·74	9631·4	601·96	1·3750
Liq. potassæ	1·036	·9653	92·60	2·117	101·60	7559·2	472·45	1·0799
Liq. sodæ	1·059	·9443	90·59	2·071	99·39	7727·0	482·94	1·1039
Ol. amygd. express	·917	1·0905	104·62	2·193	105·26	6690·9	418·18	·9558
Ol. aurant. cort	·860	1·1628	111·55	2·550	122·39	6275·0	392·19	·8964
Ol. gaultheriæ	1·173	·8525	81·79	1·869	89·73	8558·8	534·93	1·2227
Ol. lavandulæ	·890	1·1236	107·79	2·464	118·27	6493·9	405·87	·9277
Ol. limonis	·850	1·1765	112·87	2·580	123·83	6202·0	387·63	·8860
Ol. menth. pip	·900	1·1111	106·60	2·436	116·95	6566·9	410·43	·9381
Ol. morrhuæ	·920	1·0870	104·28	2·383	114·41	6712·8	419·55	·9590
Ol. olivæ	·916	1·0917	104·73	2·394	114·91	6683·6	417·73	·9548
Ol. ricini	·960	1·0417	99·94	2·284	109·65	7004·7	437·79	1·0007
Ol. terebinthinæ	·862	1·1601	111·30	2·544	122·11	6289·6	393·10	·8985
Spt. æther. nitros	·824	1·2136	116·42	2·661	127·74	6012·3	375·77	·8589
Spt. frumenti	·920	1·0870	104·28	2·383	114·41	6712·8	419·55	·9590
Spt. vini gallici	·930	1·0753	103·16	2·358	113·18	6785·8	424·11	·9694
Syrup. simplex	1·310	·7634	73·22	1·674	80·35	9558·4	597·40	1·3655
Tinct. ferri chloridi	·980	1·0204	97·89	2·238	107·40	7150·6	446·91	1·0215
Wine (red or white)	1·000	1·0000	95·94	2·193	105·26	7296·5	456·03	1·0424

* Water at 60°F. = 1·000.

The Acid of Gastric Juice is said by M. Poulet, *Jour. de Med. de Paris*, to be neither lactic nor hydrochloric acid, but hippuric acid in the form of acid hippurate of potassium, combined with neutral phosphates of lime and sodium. He claims that microscopic examination of the crystals and experiments with dialysis demonstrate this conclusively.—*New Eng. Med. Monthly, October.*

DEODORIZED TINCTURE OF OPIUM.

By R. Rother.

The writer has been informed through various public and private sources that his process for preparing deodorized tincture of opium, as published in the "American Journal of Pharmacy" for February, is characterized by a radical fault. The objectionable feature is reported to consist in the sacrifice of a large proportion of the activity. The loss of morphine, as determined by assay, is stated to vary from ¼ to ½ of the whole amount. It has been variously conjectured that either the fatty adjunct absorbs the morphine or else envelopes it so as to render its extraction from the marc impossible. These charges are certainly formidable enough, and if sustained by subsequent experience must doubtless render the process worthless. On reflection the writer concluded that the real cause of the aberration, if such there be, had not yet been surmised, that in fact the fats are not instrumental at all in this connection. The fault in reality resides in an insufficiency of time given to the extraction and the peculiar form of the opium that the formula directs to be used. The writer feels partially to blame for this in two ways; firstly, the ambiguous phrase "dried and powdered" does not indicate precisely what the writer means and employed, as it would lead to the belief that the "pulverized" or rather finely powdered opium of the market is intended. By the term used in the formula the ordinary air-dried gum rubbed into a coarse powder is, however, meant. Secondly and chiefly, the writer did not give the important and explicit direction to soften the opium by means of a preliminary maceration or digestion before submitting it to a boiling temperature and subsequent treatment with the fat. This then is actually the only difficulty about the formula. By interpolating the provision to macerate or better digest the gum at a gentle warmth for twenty-four hours first, the process leaves nothing to be desired. The writer never employs the powdered opium of the market for making the liquid preparations of opium. It is too indurated and impervious for such uses, and is in all probability otherwise injuriously altered during the process of its preparation.

The writer has most usually assayed the opium, when not obtained of guaranteed strength, used in its various preparations. As a rule, a moderately large amount of gum is best worked up in its ordinary

moist state, and the extraction then assayed before bringing the preparation to completion.

In 1875 the writer published a method for preparing tincture of opium by means of heat, and has invariably employed it ever since then. It is one of the essentials of this process that the gum be thoroughly disintegrated by the heating with water before adding the alcohol. Recently the writer has modified the operation to make it more adaptable to larger quantities. For instance, 30 avoirdupois ounces of a gum containing but little moisture was broken into rather large fragments and digested at a gentle heat with 4 pints of water for about thirty-six hours. The magma, whilst warm, was mixed with 4 pints of alcohol and poured into a capacious plated double filter and followed with diluted alcohol until 2 gallons of tincture was obtained. The filtering percolation was here discontinued, since the last portions that passed were nearly colorless and possessed of but little bitter taste.

In order now to arrive at a final measure in accord with a definite standard, it became necessary to assay this liquor for its morphine strength. For this purpose the writer employed his method of determination published in 1871. This operation, in the writer's experience, gives the best results in the simplest manner and the shortest time. It is executed as follows: Two fluidounces of the alcoholic extraction were gently evaporated to 4 fluid drachms. The clear liquid was decanted from the resinous residue and transferred to a small porcelain capsule. The residue was digested with 2 fluid drachms of water for a short time, and the decanted liquid mixed with that first obtained. Sixty grains of transparent crystallized disodic carbonate was now finely powdered and added to the mixture. After stirring the whole well together it was set aside for twelve to eighteen hours. The precipitate was now poured into a small plaited weighed filter, and washed with a little water until freed from the colored liquor. A mixture composed of 3 fluid drachms each of ether, alcohol, and water was then poured by degrees upon the precipitate and well stirred up with a small glass rod. During the last addition the precipitate was left at rest, where it had contracted to a nearly white granular powder in the apex of the filter. The last portions of the filtrate having passed away uncolored, the filter containing the precipitate was exposed in the open air until it ceased to lose weight. On weighing and deducting the tare of the filter, 15½ grains of morphine was found. This result indicated that the opium contained about 15 per cent. of

morphine, and that the 2 gallons of extraction required dilution with diluted alcohol to the measure of 330 fluidounces, in order to contain 6 grains of morphine in the fluid ounce.

Although the strength of the deodorized tincture of opium as prepared by the writer indicated, by its color during and after its preparation, that the opium must have been practically exhausted and represented in the tincture the writer, in view of the recent adverse criticisms of the process, subjected this to an assay. Two fluidounces of it was, therefore, gently evaporated to 6 fluid drachms and the liquor, which in this case remained perfectly clear, assayed as above detailed. The result was nearly 12½ grains of morphine, showing that although the tincture had been constructed on the plan of the Pharmacopœia of 1870 and a 10 per cent. opium, it was, nevertheless, owing to the superior quality of the gum above the new standard. The tincture in reality contained over 6 grains of morphine in the fluidounce, and the opium although perfectly dry when used was shown to contain about 16 per cent. of morphine. The assay, by means of disodic carbonate, yields mixtures which do not lose their transparency, as is the case with ammonia. The coloring matter is also less firmly attached, and, therefore, the resulting morphine is generally whiter and more speedily and thoroughly washed. The morphine is also absolutely insoluble in disodic carbonate. A very distinct odor of propylamminium is observed immediately after the addition of the sodic carbonate. The simpler substituted ammonias, such as, for instance, propylamminium, often result from the more complex order of these compounds, such as the natural alkaloids by treatment with caustic alkalies. But it does not appear probable that in this case the carbonated alkali has that effect. The propylamminium in this instance is very likely directly derived from a salt of propylamminium, as is the effect when ergot is treated in a similar manner. The propylamine of opium very possibly exists there as propylamminium sulphate.

Poisoning by Bisulphide of Carbon—Two cases associated with insanity are published in the *Pacific Med. and Surg. Journal.* The carbon bisulphide seems to have been inhaled very slowly; some forty out of fifty pounds having evaporated, but in what space of time we are not told. The two sufferers were brothers, without taint of insanity in the family, and both of them exhibited a form of insanity associated with murderous intent. Dr. Bard, who had charge of the cases, and who advances the theory that the insanity was due to the bisulphide of carbon, also states that a manufacturer of the article in Los Angeles also developed similar proclivities.—*Weekly Med. Review, Nov.* 10.

COMPARISON OF GALENICAL PREPARATIONS OF THE UNITED STATES AND GERMAN PHARMACOPŒIAS.

By the Editor.

(Continued from page 497.)

Sulphur lotum, U. S. Sulfur depuratum, *P. G.*—Sublimed sulphur 12 parts, ammonia water 1 part, water 12 parts; digest for 3 days. *U. S.*—Sublimed sulphur 10 parts, ammonia water 1 part, water 7 parts; agitate occasionally during one day. *P. G.*—The remaining portion of the process contemplates the removal of the ammoniacal liquid and the drying of the powder.

Sulphur præcipitatum, U. S. Sulfur præcipitatum, *P G.*—The last named authority gives no process, but merely a description and tests for purity.

Syrupus, U. S. Syrupus simplex, *P. G.*—Sugar 65 parts, water 35 parts; spec. grav. 1·310. *U. S.*—Sugar 60 parts, water 40 parts; sp. gr. 1·290. *P. G.*

Syrupus Althaeæ, U. S., P. G.—Washed marshmallow root 1 parts, water 60 parts; macerate for one hour, strain without expressing, and in 40 parts of the infusion dissolve 60 parts of sugar. *U. S.*—Washed marshmallow root 10 parts, alcohol 5 parts, water 250 parts; macerate for three hours, strain without expressing, and in 200 parts of the infusion dissolve 300 parts of sugar. *P. G.*

Syrupus Amygdalæ, U. S. Syrupus Amygdalarum, *P. G.*—Sweet almond 10 parts, bitter almond 3 parts, sugar 10 parts, orange flower water 5 parts, water sufficient to make 60 parts of emulsion, in which dissolve 40 parts of sugar. *U. S.*—Sweet almonds 50 parts, bitter almonds 10 parts, water 120 parts; make 130 parts of emulsion, in which dissolve sugar 200 parts, and add orange flower water 10 parts. *P. G.*

Syrupus Aurantii, U. S. Syrupus Aurantii Corticis, *P. G.*—Recent yellow rind of sweet orange peel, alcohol, each 5 parts; macerate for a week, express, mix the liquid with calcium phosphate 1 part and water 30 parts, filter and in 40 parts of the filtrate dissolve 60 parts of sugar. *U. S.*—Yellow rind of bitter orange peel 5 parts, good white wine 45 parts; macerate for two days, and in 40 parts of the liquid dissolve 60 parts of sugar. *P. G.*

Syrupus Aurantii Florum, U. S., P. G.—Dissolve sugar 65 parts

in orange flower water 35 parts. *U. S.*—Dissolve sugar 60 parts in water 20 parts and add orange flower water 20 parts. *P. G.*

Syrupus Ferri Iodidi, U. S. Syrupus Ferri jodati, *P. G.*—The manipulation is alike in both Pharmacopœias, but there is a vast difference in the strength: 1,000 parts of the syrup contain 82 parts of iodine and 600 parts of sugar, *U. S.*, against 41 parts of iodine and 650 parts of sugar, *P. G.* The latter is just one-half the strength of the former.

Syrupus Ipecacuanhæ, U. S., P. G.—Mix fluid extract of ipecac, 5 parts with syrup 95 parts. *U. S.*—Ipecac 1 part, alcohol (sp. gr. ·894) 5 parts, water 40 parts; obtain 40 parts of infusion, and dissolve in it 60 parts of sugar. *P. G.*—The proportional strength is as 5 : 1.

Syrupus Rhei, U. S., P. G. The manipulation is nearly alike in both Pharmacopœias. The ingredients for 1,000 parts of syrup are:

Rhubarb, sliced.	Cinnamon.	Potass. carb.	Water.	Infusion.	Sugar.	
90 p.	18 p.	6 p.	420 p.	400 p.	600 p.	*U. S.*
50 p.	10 p.	5 p.	500 p.	400 p.	600 p.	*P. G.*

Syrupus Rubi Idæi, U. S., P. G.—Bruise raspberries, after three days express, when completely fermented filter, and in 40 parts of the filtrate dissolve 60 parts of sugar. *U. S.* This is the formula of the first German Pharmacopœia, except that the quantity of sugar has been reduced. The following is an improvement on this formula, since fermentation is directed at a certain temperature, and the proper time for finishing the syrup is ascertained by a simple test. Bruised raspberries are kept in a covered vessel at about 20°C. (68°F.) and frequently stirred until a small quantity of the filtered juice may be mixed with half its volume of alcohol without becoming turbid; then express, filter, and in 35 parts of the filtrate dissolve 65 parts of sugar. *P. G.*

Syrupus Senegæ, U S., P. G.—Fluid extract of senega 160 parts, ammonia water 4 parts, water 250 parts; obtain 400 parts of filtrate, and dissolve in it 600 parts of sugar. *U. S.*—Senega 50 parts, alcohol (sp. gr. ·832) 50 parts, water 450 parts; macerate for two days, express, and in 400 parts of the filtrate dissolve 600 parts of sugar. *P. G.*—The relative strength is about as 3 : 1.

Syrupus Sennæ, U. S., P. G.—Digest 33 parts of senna at 50°C. (122°F.), first with 160 parts of water for 24 hours, then with 70 parts of water for six hours; evaporate the expressed liquids to 30 parts, add alcohol 4 parts and oil of coriander ·04 part, obtain 40

parts of filtrate, and dissolve in it 60 parts of sugar. *U. S.*—Senna ·10 parts, fennel 1 part, alcohol (sp. gr. ·832) 5 parts, water 45 parts; digest for 20 minutes, strain without expressing, and in 35 parts of the filtrate dissolve 65 parts of sugar. *P. G.*—The proportion of senna represented is about as 5 : 1.

Tincturæ.—The tinctures of the German Pharmacopœia are mostly made by maceration for a week at about 15°C. (59°F.); the liquid retained by the drug is not recovered. The spirit used has the spec. grav. ·830–·834; the diluted spirit is ·892–·896.

Tinctura Aconiti, U. S., P. G.—Aconite root 40, tartaric acid ·4, alcohol sufficient for 100 parts. *U. S.*—Aconite root 10, diluted spirit 100 parts. *P. G.*

Tinctura Aloes, U. S., P. G.—Purified Socotrine aloes 10, liquorice 10, diluted alcohol sufficient for 100 parts. *U. S.*—Cape aloes 20, spirit 100 parts. *P. G.*

Tinctura Arnicæ Florum, U. S. Tinctura Arnicæ, *P. G.*—Arnica flowers 20, diluted alcohol sufficient for 100 parts. *U. S.*—Arnica flowers 10, diluted spirit 100 parts. *P. G.*

Tinctura Asafœtidæ, U. S. Tinctura Asæ fœtidæ, *P. G.*—Alike.

Tinctura Aurantii amari, U. S. Tinctura Aurantii, *P. G.*—Bitter orange peel 20, diluted alcohol sufficient for 100 parts. *U. S.*—Bitter orange peel 20, diluted spirit 100 parts. *P. G.*

Tinctura Benzoini, U. S. Tinctura Benzoës, *P. G.*—Alike.

Tinctura Cannabis Indicæ, U. S., P. G.—Indian cannabis 20, alcohol sufficient for 100 parts. *U. S.*—Extract of Indian cannabis 5, spirit 95 parts. *P. G.*—Since 20 parts of gunjah yield about 2½ parts of extract, the U. S. preparation is of about one-half the strength of the latter.

Tinctura Cantharidis, U. S. Tinctura Cantharidum, *P. G.*—Cantharides 5, alcohol sufficient for 100 parts. *U. S.*—Cantharides 10, spirit 100 parts. *P. G.*—This, like the next, is of double the strength of the U. S. Pharmacopœia.

Tinctura Capsici, U. S., P. G.—Capsicum 5 parts, alcohol (19 p.) and water (1 p.) sufficient to make 100 parts. *U. S.*—Capsicum 10, spirit 100 parts. *P. G.*

Tinctura Cinchonæ, U. S. Tinctura Chinæ, *P. G.*—Yellow cinchona 20 parts, glycerin 10 parts, alcohol and water (in the proportion of 13 : 5) sufficient to make 100 parts. *U. S.*—Red or other cin-

chona (containing not less than 3·5 per cent. of alkaloids) 20 parts, diluted spirit 100 parts. *P. G.*

Tinctura Cinchonæ composita, U. S. Tinctura Chinæ composita, *P. G.*—Red cinchona 10 parts, bitter orange peel 8 parts, serpentaria 2 parts, glycerin 10 parts, alcohol and water (in the proportion of 8 : 1) sufficient to make 100 parts. *U. S.*—Red cinchona 12 parts, bitter orange peel 4 parts, gentian 4 parts, cinnamon 2 parts, diluted spirit 100 parts. *P. G.*

Tinctura Cinnamomi, U. S., P. G.—Cinnamon 10 parts, alcohol and water (in the proportion of 3 : 2) sufficient for 100 parts. *U. S.*—Cinnamon 20, diluted spirit 100 parts. *P. G.*

Tinctura Colchici, U. S., P. G.—Colchicum seed 15 parts, diluted alcohol sufficient for 100 parts. *U. S.*—Colchicum seed 10 p., diluted spirit 100 parts. *P. G.*

Tinctura Ferri Acetatis, U. S. Tinctura Ferri acetici aetherea, *P. G.*—Solution of ferric acetate (33 per cent. of the salt) 50 parts, alcohol 30 parts, acetic ether 20 parts. *U. S.*—Solution of ferric acetate (16·7 per cent. of the salt) 80 parts, spirit 12 parts, acetic ether .8 parts. *P. G.*—The tinctures contain respectively 16·5 and 13·37 per cent. of ferric acetate.

Tinctura Ferri Chloridi, U. S. Tinctura Ferri chlorati aetherea. *P. G.*—Solution of ferric chloride 35 parts, alcohol 65 parts; keep for at least three months before using it. *U. S.*—Solution of ferric chloride (see page 442) 10 parts, ether 20 parts, spirit 70 parts; expose to the sunlight until decolorized, then keep in the dark, air being occasionally admitted, until the tincture has a yellow color. *P. G.*—10 gm. should yield ·652 gm., *U. S.*, ·1428 gm., *P. G.*, of ferric oxide.

Tinctura Gallæ, U. S. Tincturæ Gallarum, *P. G.*—Nutgall 20 p., glycerin 10 parts, diluted alcohol sufficient for 80 parts. *U. S.*—Nutgall 20 parts, diluted spirit 100 parts. *P. G.*

Tinctura Iodi, U. S. Tinctura Jodi, *P. G.*—Iodine 8, alcohol 92 parts. *U. S.*—Iodine 10, spirit 100 parts. *P. G.*

Tinctura Krameriæ, U. S. Tinctura Ratanhiæ, *P. G.*—Krameria 20 parts, diluted alcohol sufficient for 100 parts. *U. S.*—Krameria 20 parts, diluted spirit 100 parts. *P. G.*

Tinctura Lobeliæ, U. S., P. G.—Lobelia 20 parts, diluted alcohol sufficient for 100 parts. *U. S.*—Lobelia 10 parts, diluted spirit 100 parts. *P. G.*

Tinctura Moschi, U. S., P. G.—Musk 10 parts, water and alcohol each 45 parts; make 100 parts. *U. S.*—Musk dried over sulphuric acid 2 parts, water and diluted spirit each 50 parts. *P. G.*

Tinctura Myrrhæ, U. S., P. G.—Identical.

Tinctura Nucis Vomicæ, U. S. Tinctura Strychni, *P. G.*—100 p. of the tincture contain 2 parts of dry alcoholic extract of nux vomica. *U. S.*—Nux vomica 10 parts, dilute spirit 100 parts. *P. G.*—This contains between ·7 and ·8 per cent. of extract, equal to about ·4 or ·5 per cent. of dry alcoholic extract.

Tinctura Opii, U. S. Tincture Opii simplex, *P. G.*—Powdered opium (12–16 per cent. of morphine) 10 parts water and alcohol each 40 parts; make 100 parts. *U. S.*—Powdered opium (10 per cent. of morphine) 10 parts, diluted spirit and water, each 50 parts. *P. G.*—The tinctures contain ·952 per cent., *P. G.*, not less than 1·2 per cent. of morphine. *P. G.*

Tinctura Opii camphorata, U. S. Tinctura Opii benzoica, *P. G.*—The formulas direct

Pow. opium.	Benz. acid.	Camphor.	Oil anise.	Glycerin.	Dil. alcohol.
4 p.	·4	4	4	40	suff. for 1000 parts. *U. S.*
5	20	10	5	—	960 parts. *P G.*

Tinctura Scillæ, U. S., P. G.—Squill 15 parts, diluted alcohol sufficient for 100 parts. *U. S.*—Squill 20 parts, diluted spirit 100 parts, *P. G.*

Tinctura Valerianæ, U. S., P. G.—Valerian 20 parts, mixture of alcohol 2 parts, and water 1 part, sufficient to make 100 parts. *U. S.*—Valerian 20 parts, diluted spirit 100 parts. *P. G.*

Tinctura Zingiberis, U. S., P. G.—Ginger 20 parts, alcohol sufficient to make 100 parts. *U. S.*—Ginger 20 parts, diluted spirit 100 parts, *P. G.*

Unguentum U. S. Unguentum Cereum, *P. G.*—Lard 80 parts, yellow wax 20 parts. *P. G.*—Olive oil 70 parts, yellow wax 30 parts, *P. G.*

Unguentum Aquæ Rosæ, U. S. Unguentum leniens, *P. G.*

Exprs'd oil of almond.	Spermaceti.	White wax.	Rose water.
50 p.	10 p.	10 p.	30 p. *U. S.*
64 p.	10 p.	8 p.	32 p. dist'd water.

To 50 grams add one drop of attar of rose. *P. G.*

Unguentum Diachylon, U. S., P. G.—Lead plaster 60 parts, olive oil 39 parts, oil of lavender 1 part. *U. S.*—Lead plaster free from

glycerin and water, 50 parts, olive oil 50 parts; several hours after the ointment has been made, it is to be again well stirred. *P. G.*

Unguentum Hydrargyri, U. S. Unguentum Hydrargyri cinereum, *P. G.*—Mix mercury 450 parts, compound tincture of benzoin 40 parts, and mercurial ointment 100 parts; then add a partially cooled mixture of suet and lard, each 225 parts. *U. S.*—Melt together lard 390 parts, and suet 210 parts; with 90 parts of the fat incorporate 300 parts of mercury, and add the remainder of the fat. *P. G.*—The ointment contains one-half, *U. S.*, one-third, *P. G.*, its weight of mercury, and metallic globules should not be visible with the naked eye, *P. G.*, under a magnifying power of ten diameters, *U. S.*

Unguentum Hydrargyri ammoniatum, U. S. Unguentum Hydrargyri album, *P. G.*—Ammoniated mercury 10 parts, benzoinated lard, *U. S.*, paraffin ointment, *P. G.*, 90 parts.

Unguentum Hydrargyri Oxidi rubri, U. S. Unguentum Hydrargyri rubrum, *P. G.*—The strength is identical, but the base is ointment, *U. S.*, paraffin ointment, *P. G.*

Unguentum Plumbi Carbonatis, U. S. Unguentum Cerussæ, *P. G.*—Lead carbonate 10 parts, benzoinated lard 90 parts, *U. S.*—Lead carbonate 30 parts, paraffin ointment 70 parts, *P. G.*

Unguentum Potassii Iodidi, U. S. Unguentum Kalii jodati, *P. G.*—Potassium iodide 12 parts, sodium hyposulphite 1 part, boiling water 6 parts, benzoinated lard 81 parts, *U. S.*—Potassium iodide 10 parts, water 5 parts, paraffin ointment 85 parts, *P. G.*

Unguentum Zinci Oxidi, U. S. Unguentum Zinci, *P. G.*—Oxide of zinc 20 parts, benzoinated lard 80 parts, *U. S.*—Commercial oxide of zinc 10 parts, lard 90 parts, *P. G.*

Vinum Antimonii, U. S. Vinum stibiatum, *P. G.*—Practically identical; the menstruum is stronger white wine, *U. S.*, sherry wine, *P. G.*

Vinum Colchici Seminis, U. S. Vinum Colchici, *P. G.*—Colchicum seed 15 parts, strongor white wine sufficient for 100 parts, *U. S.*—Colchicum seed 10 parts, sherry wine 109 parts, *P. G.*

Vinum Ipecacuanhæ, U. S., P. G.—Fluid extract of ipecac. 7 parts, stronger white wine 93 parts, *U. S.*—Ipecac. 10 parts, sherry wine 100 parts, *P. G.*

Vinum Opii, U. S. Tinctura Opii crocata, *P. G.*—Powdered opium 10 parts, cinnamon and cloves each 1 part, stronger white wine sufficient for 100 parts, *U. S.*—Powdered opium 10 parts, saffron $3\frac{1}{3}$ parts,

cinnamon and cloves each ⅔ part, diluted spirit and water, each 50 parts, *P. G.*

Vinum Rhei, U. S. Tinctura Rhei vinosa, *P. G.*—Rhubarb 10 parts, calamus 1 part, stronger white wine, sufficient for 100 parts, *U. S.*—Rhubarb 8 parts, bitter orange peel 2 parts, cardamom 1 part, sherry wine 100 parts, *P. G.*

CALCIUM LACTOPHOSPHATE.

By R. Rother.

When various orthophosphates, in a freshly precipitated condition, are treated with lactic acid, a solution results according to a fixed and definite proportion of the two components. The generated compounds are rightly termed lactophosphates. But the solution was, and is even now, thought to be nothing more than a mechanical effect, analagous to simple solutions in general, unattended by the action of chemism.

When tricalcic orthophosphate and lactic acid react upon each other, the absorption of the former terminates in the proportion of 1 m. of it to 4 ms. of lactic acid. Such a solution immediately deposits a granular precipitate when heated. It is not even permanent at ordinary temperatures, since it lets fall a profuse gelatinous precipitate after the lapse of a moderate time. The two precipitates are presumably not the same, since the latter is soluble and the former insoluble in lactic acid. In this connection, the writer also ascertained that when the lactic acid is originally added in the ratio of 6 ms. to 1 m. of the orthophosphate, the solution remains permanently intact.

At the time the writer discussed the subject of lactophosphates in general, the conclusion was reached that in the case of the impermanent calcium compound the redistribution of the affinities resulted in the generation of acid calcium phosphate and normal calcium lactate, thus:

$$Ca_3(PO_4)_2+4HLc=CaH_4(PO_4)_2+2CaLc_2.$$

On the application of heat it was assumed that insoluble dicalcic phosphate and acid calcium lactate was formed, as follows:

$$Ca_3(PO_4)_2+4HLc=2CaHPO_4+CaLc_2.2HLc.$$

In the case of the stable compound, generated by 6 ms. of acid, a construction was deemed probable whereby normal calcium lactate and free orthophosphoric acid resulted, as follows:

$$Ca_3(PO_4)_2+6HLc=3(CaLc_2)+2(PO_4H_3).$$

These reactions preclude the production of a calcium lactophosphate, properly so called. Recently, however, the writer has come to the conclusion that the resulting compounds are, strictly speaking, lactophosphates in a truly chemical sense. Various organic acids directly unite with one another, or with their own normal salts, in a distinctly chemical manner, in certain definite proportions, and yet with their atomicities and basicities previously saturated. As in such instances a redistribution of the links of valence cannot be assumed, the writer conceived a subdivision of the involved affinities, and termed this new condition ultravalence. In the so-called acid calcium lactate, for instance, 1 m. of normal calcium lactate is directly united with 2 ms. of lactic acid, just as in the case of the appended water of the hydrites. Now, this chemical state cannot be represented by unit atomicities, but can at once be indicated on the assumption of fractional atomicities.

In such combinations it becomes necessary to employ a new notation, characteristic of the principle of ultravalence. Accordingly, acid calcium lactate may be written thus: (HLc_2)—Ca—(HLc_2). At first appearance this formula does not differ from the usual notation, and in reality it is merely an extension of the principle of apparent valence. The new theory assumes that, just as in an unsaturated radicle the inapparent or static bonds do service within the compound molecule, so do the active bonds when the molecule is recompounded in a radicle form. This is aptly illustrated by assuming, for instance, a triad element to combine with one monad radicle. The resulting unsaturated compound molecule now acts as a dyad radicle, which, after combining with another monad, still has the property of a monad radicle. But after uniting a third time it yet continues to coalesce with saturated and unsaturated molecules.

The doctrine of atomicity is now apparently exhausted, and does not profess to explain this persistent activity. Unit atomicities now cease to be applicable, but the doctrine still prevails after the assumption of fractional bonds. This is again made plain, if, as in the case of argentous chloride, for instance, we assume an argentic molecule made up of three silver radicles, held together by their full atomic power, and replace one of them by a chlorine radicle. The chlorine here assumes the place and function of the vacated silver radicle, in whatever degree of union this previously possessed.

The generation of potassic diiodide is similarly effected from a triple

potassic molecule in which two iodine radicles are substituted. Another striking example may be given in the case of crystallized sodic sulphate. If in an unduodecimal molecule of water, $H_{22}O_{11}$, we replace O by SO_4, we get $H_{22}O_{10}SO_4$, and if in this we substitute H_2 by Na_2 we get $H_{20}O_{10}Na_2SO_4$. It is here again presumed that, whatever the relation of H_2O is to $H_{22}O_{11}$, the same will hold as regards Na_2SO_4 in reference to $10H_2O.NaS_2O_4$.

Now, referring to the formula of acid calcium lactate, it will be found that it is obtained, in the same manner as the foregoing compound, by substituting Ca for H_2 in the quadruple group, H_4Lc_4.

The empirical or molecular formula of the compound formed by dissolving calcium orthophosphate in lactic acid to saturation is $Ca_3(PO_4)_2(HLc)_4$, but, on the principle above illustrated, its constitutional expression is:

$$\begin{array}{c}(HLc_2)—Ca—PO_4—H\\ \qquad\qquad\quad |\\ \qquad\qquad Ca\\ \qquad\qquad\quad |\\ (HLc_2)—Ca—PO_4—H\end{array}$$

The stable lactophosphate, $Ca_3(PO_4)_2(HLc)_6$, is similarly written, as:

$$\begin{array}{c}(HLc_2)—Ca—PO_4—(H_2Lc)\\ \qquad\qquad\quad |\\ \qquad\qquad Ca\\ \qquad\qquad\quad |\\ (HLc_2)—Ca—PO_4—(H_2Lc)\end{array}$$

The general experience with the four-molecule lactophosphate has uniformly pointed to its unstable character, nevertheless the Pharmacopœia has adopted this compound. On the occasion whereat the writer announced its instability especial reference was made to the six-molecule salt, and this was recommended for its permanence and general desirability. A process was also submitted for its preparation, based on the usual method for making the four-molecule salt. It was, however, indicated by a reaction, reproduced above, that it could be much more readily obtained by an inverse operation through the application of calcium lactate and phosphoric acid. The writer, however, did not give a process based on this principle, firstly, for the reason that calcium lactate was not found in the market, but chiefly for the reason that a suitable phosphoric acid was equally scarce. Since, however, the Pharmacopœia now directs a phosphoric acid of proper form and quality, the inverse method can therefore be employed with great advantage over the rather tedious and circumstantial official process. In

adapting the new process to the official standard the writer discards the four-molecule salt in favor of that with six molecules of lactic acid. The pharmacopœial proportions of all the ingredients are maintained, excepting calcium, which necessarily is reduced to two-thirds its official proportion. The calcium lactate is readily generated by means of calcium carbonate and lactic acid.

In using parts by weight in the construction of working formulas, it is frequently impossible to make a proper adjustment by means of integral parts where the ultimate weight is reduced to the decimal scale. In consequence, many official formulas are necessarily inaccurate. The writer has obviated this by employing atomic proportions and larger numbers, regardless of the roundness of the final number of parts. The official standard is, however, maintained, excepting where a deviation indicated a positive advantage. The new formula for preparing syrup of calcium lactophosphate is as follows:

Calcium carbonate	150 parts.
Lactic acid, sufficient, or	360 "
Phosphoric acid	196 "
Sugar	6,545 "
Water, sufficient for	10,908 "

Mix the lactic acid with 1,500 parts of water, and gradually add the calcium carbonate. If the mixture does not become clear, warm it gently and add lactic acid, drop by drop, until a transparent solution is obtained. To this add the phosphoric acid previously mixed with 1,500 parts of water together with enough more water to make the whole weigh 4,363 parts. Then add the sugar, and when this has dissolved, with frequent stirring, filter the syrup through paper.

Oleum Gaultheriæ.—At the New York Medical and Surgical Society, Dr. Flint stated that the results of the trial made of this substance in thirteen cases of rheumatism at the Bellevue Hospital served to show rather better results than those which are ordinarily obtained from salicylic acid. The oil of wintergreen was administered several times a day in ten-drop doses in flax-seed tea, which renders it less disagreeable to the taste and to the stomach. In some of the cases the alkaline treatment was employed at the same time. Dr. Ball stated that Dr. Kinnicutt had used the *oil of Gaultheria* in a number of cases of acute rheumatism with even better results than those mentioned by Dr. Flint. It was administered in milk, and was less disagreeable when so taken than salicylic acid or salicylate of sodium.—*New York Medical Journal*, June 30, 1883.

SOPHISTICATED OIL OF CLOVES.

By G. Spencer.

Some time since, having begun a series of experiments upon essential oils with ferric chloride, I was struck with the green coloration produced with a few samples of oil of cloves that came under my notice. At that time I did not further trouble, but mention having been made of the same thing by Herr Beckurts in the *Pharm. Centralh.*, xxiv, 377, a *résumé* of which appears in "The Month," I determined to repeat his experiments on a sample obtained for retail purposes a short time ago, with exactly the same results, viz., "yellowish in color, very weak aromatic taste;" so weak, indeed, that shaking the bottle and placing the stopper on the tongue did not seem one half so pungent as biting an ordinary clove, "with odor exactly that of true oil of cloves." I found the specific gravity to be only 1·02 instead of 1·03 or as it should be, according to the German Pharmacopœia 1·041 to 1·061.

When exposed to bromine vapor a deep black was produced, but no blue nor violet. With ferric chloride a green coloration took place, with perhaps a trace of blue at the line of juncture produced by carefully pouring the "oil of cloves" into a solution of ferric chloride in alcohol, but which entirely disappeared on shaking. By distilling a portion and carefully treating the distillate with KHO, and afterwards with argentic nitrate, the latter was reduced and a resplendent mirror formed, proving the presence of a formate. That left in the retort was of a dark brown color, treacly appearance, and a peculiar faint unpleasant odor. This treated with Fe_2Cl_6 gave a much deeper green than the "oil of cloves." Treated with KHO it was only partially saponifiable, leaving a pinkish-buff deposit, but the odor of cloves to a large extent was restored.

It seems to be a mixture of genuine oil of cloves, with a compound belonging to the creasol class, as the latter gives the same coloration with Fe_2Cl_6. All pharmacists should examine what they now have and receive with caution any new samples into stock, as the kind above referred to came from a first-class London house, and in all probability has been in the market over six months, it being about that time since I first noticed the green coloration with ferric chloride.—*Phar. Jour. Trans.*, Sept. 1883, p. 184.

IODINE IN COD LIVER OIL.

By Edward C. C. Stanford, F.C.S.

"It is proposed to verify the statement in Garrod's 'Materia Medica' that cod liver oil contains 0·06 per cent. of iodine." See "Blue List."

If this statement were true, cod liver oil would be one of the richest sources of iodine with which we are acquainted. At present the marine algæ form the only commercial European source of iodine. The largest quantity of iodine found in the deep sea tangle or stems of *Laminaria digitata* amounts in the fresh plants to about 0·1 per cent. The quantity obtained when this plant is burned into kelp seldom reaches 0·05 per cent. The average yield from laminaria drift on the large scale is 0·025 per cent., but many thousands of tons of seaweed have been made into kelp and worked for iodine, which have not yielded more than 0·005 per cent., and some even less than this, so that we have to deal on the large scale with a material, and constantly to test samples, containing very small percentages of iodine. I mention this in connection with the process daily employed for many years in estimating small amounts of iodine in our laboratory, and which has also been employed in obtaining the results from cod liver oil to be published in this paper.

Much difference of opinion has arisen amongst former observers with regard to iodine in cod liver oil, and the statements of results are extremely conflicting, some chemists having failed to find iodine at all, others only in some specimens of this oil. Other chemists again have estimated the proportion of iodine as much higher than the quantity above indicated; and it has been assumed that this element represents an important factor in its medicinal value.

In a well known work on materia medica the editors remark that the state of combination in cod liver oil "may, perhaps, tend to develop a peculiar action of iodine and bromine and endow them with an efficacy not otherwise attainable."

The following results have been published at various times by the authorities quoted:

	Iodine per cent.
Dorvault found in cod liver oil	0·150
Raie found in cod liver oil	0·180
Joseph found nearly ½ per cent.	0.487
Machenroden found	0·162 to 0 324
Grager found in light brown oil	0·0846
Dr. de Jongh found in pale oil	0·0374
" " pale brown	0·0406
" " brown	0·0295

All these are extremely high and improbable.

Mr. Mitchell Bird (*Pharm. Journ.*, [2], i., p. 546) gives results of analyses of six varieties of cod liver oil, which are much nearer what I believe to be the truth. The method and the results differ considerably from mine, although we are both agreed in the fact that we have found iodine in all the specimens examined.

The precentage results are as follows, the iodine being calculated as potassium iodide:

	As KI		As Iodine.
1. Cod liver oil, Norway	·0021		
2. Cod liver oil, Norway	·0018	average	
3. Cod liver oil, Norway	·0016	·001775	·001355
4. Cod liver oil, Norway	·0016		
5. Cod liver oil, Newfoundland	·0012	average.	
6. Cod liver oil, Newfoundland	·0014	·0013	·000993

He used 5,000 grs. of the oil for each experiment and saponified with alcoholic solution of caustic potash, burned the soap formed and dissolved out the salts; after saturating the solution with sulphuric acid and separating the potassium sulphate deposited, he employed the starch test, setting free the iodine with nitrite of potassium and sulphuric acid, and comparing the color with standard solutions of potassium iodide. My method is different; it is a delicate process of very general application and one that I adopted some years ago, having discarded all others in its favor. I will describe it here as applied to kelp, one of the most troublesome and various of all commercial substances to sample and test.

To insure an accurate sample, about 100 lbs. are carefully picked from a cargo of say 100 tons, and ground up. Of this 100 grains are taken to estimate the moisture, and another 100 grains to estimate the soluble matter—the potash and the iodine. The kelp is treated with about 4 ounces of hot water, which dissolves little or none of the oxysulphides; this operation is repeated, the residue washed, and the solution made up to 5,000 grains measure. Of this one-tenth part, or 500 grains measure, equal to 10 grains of kelp, is taken for estimating the iodine, so that we never operate on more than one-tenth of a grain of iodine, generally one-twentieth, often one-hundredth. In fact, if the amount present exceeds one-tenth of a grain, we always dilute the solution. One hundred grains measure of bisulphide of carbon are added, and a few drops (1 to 3) of nitrosulphuric acid[1] dropped in.

[1] The nitrosulphuric acid is made by treating starch with nitric acid and passing the nitrous fumes into sulphuric acid, 1·843 sp. gr. to saturation. The mixture keeps very well.

The testings are performed in large even tubes and compared with graduated standard solutions of potassium iodide treated in the same manner. By this method $\frac{1}{250000}$ part is easily detected and measured, and up to $\frac{1}{100000}$ part the estimation is very accurate. If the iodine in a seaweed or other organic substance is to be determined, it is carbonized in a small iron retort or crucible, and the charcoal treated in the same way. Burning to ash, however carefully done, involves a considerable loss of iodine, more than is generally supposed. For instance, a sample of seaweed ash exposed for twenty-four hours in an open crucible over an ordinary Bunsen burner will not retain a trace of iodine at the end of that time. We invariably carbonize the material in preference to burning to ash, in order to retain all the iodine and to easily extract the salts. Some of these specimens are extremely difficult, indeed, almost impossible, to burn to complete ash, on account of the large proportion of fusible salts present. In estimating the small quantities of iodine necessary in our analyses we are really limited to color tests. I have long discarded starch, as it introduces an organic substance very liable to change, and in many circumstances unreliable. Moreover, in my hands it is not so sensitive as that with bisulphide of carbon. The solution is not perfectly transparent, and the indications not so sharp. The color is spread over the whole liquid, and when dilute can only be seen by looking down the length of the tube, whereas in the bisulphide of carbon test it is removed out of the solution and concentrated in a sixth of the volume at the bottom of the tube. The comparison of the two methods is very marked. In testing a solution of potassium iodide containing only $\frac{1}{250000}$ part of iodine, the maximum effect is immediate, and another advantage is that the iodine can be easily separated from its solution in bisulphide of carbon. We usually recover the latter by treating it with zinc in the presence of water. The specimens of cod liver oil experimented on, for which I am indebted to our mutual friend and former President, Mr. Reynolds, were taken in quantities of 5,000 grains each, saponified with 1,000 grains of caustic soda, pure and free from iodine, then carbonized in a large porcelain crucible; the resulting charcoal was treated with hot water and made up to 5,000 grains measure. One-tenth of this, or 500 grains, was found quite sufficient to detect the presence of iodine and to estimate it. Three experiments were made, taking 500 grains, 2,500 grains, and 1,000 grains respectively, with pretty concordant results. The mean results are appended.

In the first experiment the solution was tested at once in the manner indicated. In the second, the solution was neutralized with hydrochloric acid in the presence of the carbon bisulphide, no iodine was eliminated until the nitrosulphuric acid was added. In the third, the solution was neutralized with hydrochloric acid before the addition of the test solutions. Little difference was noticed. The following six specimens were selected:

No. 1. Cod liver oil, pale.

No. 2. Cod liver oil, Norway.

No. 3. Cod liver oil, manufactured by Carr & Sons, Berwick-on-Tweed.

No. 4. Cod liver oil, English.

No. 5. Cod liver oil, Newfoundland.

No. 6. Light brown cod liver oil.

The mean proportions of iodine found were per cent.—

No. 1.	0·000410	
No. 2.	0·000434	
No. 3.	0·000276	Mean percentage of iodine.
No. 4.	0·000138	0·000322.
No. 5.	0·000315	
No. 6.	0.000360	

I also estimated the iodine in fresh cod liver; the fishmonger informed me that it is not yet in season, but the result is here appended. Five thousand grains were treated in the same manner as the oil. Having stated on a former occasion (B. Pharm. Conference, Liverpool) that the oil vomited by the fulmar (*Fulmaris glacialis*)[1] of St. Kilda, and which, though obtained from a bird, has the reactions of a fish liver oil, contains iodine, I have also estimated this amount. Five thousand grains were treated in the same way as the cod liver oil.

Cod liver oil dragées are stated to be made of cod liver from which the oil has been removed; an analysis of these is also appended. One thousand grains or 173 of the dragées were employed and saponified with 200 grains of caustic soda. These are extremely rich in iodine, and would form a valuable source of that element if they can be procured cheap enough to contend with the present low prices. I notice, however, that a box of 250 dragées sells at 5*s.*, and is considered (by the maker) to be equal to 6 pints of oil, so that the quantity employed would be equal to 83 ounces or 36,312 grains, or about seven times

[1] *Pharmaceutical Journal*, Nov. 1870.

the quantity of oil used in the other experiments. It contains one hundred and eighty seven times the proportion of iodine.

	Per cent.
Fulmar oil contains iodine	0·000095
Cod liver fresh contains iodine	0·000817
Cod liver oil dragées contain iodine	0·056366[1]

It will be noticed that the fresh cod liver contains more than double as much iodine as the mean percentage in the oil. Mr. Gate has kindly sent me an estimate of the yield from his experience of ten year's average of oil from cod liver; it is about 45 per cent., taking the best time, December. The inference is that the liver without the oil would contain a much higher percentage of iodine, as shown indeed in the dry dragées. And I shall not be surprised to find as much in the fish. This point is under investigation.

Scotch herring has been said by "Jonas" to contain iodine, and this is also under investigation.

This morning I have received the results of the analysis of fresh cod, herring, and herring brine.

5,000 grains of fresh cod were treated with.....500 grains caustic soda.
[2] 5,000 grains of salt herrings were treated with..... " "
[2] 5,000 grains of herring brine were treated with... " "
Fresh codfish contained ·00016 per cent. iodine dry = ·000829.
Scotch herring salted contained ·00065 per cent. iodine.
" brine " ·00012 " "
The codfish contained 80·7 per cent. water.

In the fresh codfish the analyst for the first time in these experiments was troubled with a large quantity of sulphides, and in this case only was not satisfied with the indication from 500 grains measure, and was obliged to use the larger quantity.

It will be seen that the herring contains four times the amount of iodine contained in the codfish, and more than in any of the samples of cod liver oil; if, therefore, the iodine be the medicinal element, you should recommend Scotch herring salted, it is very cheap at present.

I find the subject becoming interesting, and, indeed, alarming to the iodine maker, and intend examining other varieties of fresh fish, for

[1] In the published analysis of these by Professor Garreau the iodine is estimated at 0·154 per cent., *i.e.*, richer than any other known organic substance.

[2] Two determinations were made, one with 500 grains and another with 4,500 grains, and the mean taken.

I expect to find iodine in all, and, if so, every man who eats fish will become his own iodine eliminator. Specimens of true genuine unmixed whale, seal, and bottlenose oil have been sent me by my friend, Captain John Gray, a celebrated Peterhead whaler, to whom the Arctic regions are a kind of "Winter Garden," and these are under examination, but I cannot yet report the results.

Since the publication of the paper, the following results have been obtained, the respective oils having been treated in the same manner as the cod liver oil:

	Per cent.
Whale oil, cold drawn, contains iodine	·00001
Bottle-nose " "	·00010
Seal " "	·00005

—*Phar. Jour. and Trans.*, November 3, 1883, p. 353.

ON ALGIN, A NEW SUBSTANCE OBTAINED FROM SOME OF THE COMMONER SPECIES OF MARINE ALGÆ.

By E. C. C. Stanford.

The main object of the present paper is to introduce a new seaweed industry, the present uses for this substance being very limited, and in some cases a great loss of useful material occurs in the preparation of the products for commercial purposes. In the process recommended by the author, the seaweed is first macerated with cold water by washing in a number of vats in turn, by which means about one-third of the weight of the sea-weed is removed. The weed is now bleached with chlorinated lime-water, treated with acid, and washed. To extract the algin, it is acted on with one-tenth of its weight of sodium carbonate for 24 hours in the cold, and is then carefully heated, filtered, and evaporated: the residue on the filter is cellulose, and can be used in the manufacture of paper. The result of this treatment of *laminaria* is the separation of the sea-weed into the following parts: Moisture 20, extracted by water 30, extracted by acid 5, extracted by sodium carbonate (*algin*) 35, and cellulose 10 per cent.

When evaporated to dryness the *aqueous extract* forms a viscid mass, consisting of the salts mixed with a saccharine matter resembling mannite in appearance; this precipitates Fehling's solution to the extent of 15 per cent. glucose; it does not ferment, and would hence be very useful, but as yet there is no process for separating it from the salts. The whole mass is therefore carbonized and treated in the usual manner

for separating the iodine and salts. Analysis of mixed samples of the salts yielded the following results:

	Fucus vesiculosus.	Laminaria stenophylla.
Calcium sulphate	1·69	4·33
Potassium sulphate	11·29	23·62
Potassium chloride	19·90	13·71
Sodium chloride	60·96	58·20
Magnesiun chloride	4·35	.....
Sodium carbonate	0·53	.....
Sodium iodide	1·26	0·12
	99·98	99·98

From experiments, it is demonstrated that the extraction is practically complete after four macerations.

The *sodium carbonate extract* is evaporated, and the residue (the *algin* combined with soda) when dry resembles gum in appearance, but can be obtained in thin transparent flexible sheets. The solution is slightly alkaline; any great excess of sodium carbonate apparently destroys the algin, whilst excess of acid gelatinizes it so that a solution of only 2 per cent. becomes semi-solid when acidified. A solution can be neutralized without the algin being precipitated. The solution gives the following reactions with various reagents. Dilute mineral acids generally coagulate it. Boracic acid, however, has no effect; and it is not affected by acetic, formic, citric, tartaric, or benzoic acids. Barium, calcium, strontium, copper, zinc, aluminium, tin, antimony, cobalt, and nickel salts all precipitate it. Ferric chloride gives a dark brown coagulum; mercurous nitrate forms a white precipitate, but mercuric chloride and silver nitrate have no effect. Both basic and normal lead acetates give white precipitates. It is unaffected by magnesium salts; by potassium silicate, dichromate, ferrocyanide, and permanganate; and by sodium borate, tungstate, stannate and succinate, and by tannin. Concentrated sulphuric acid dissolves it; concentrated nitric oxidizes it, oxalic acid being amongst the products. From these reactions it will be seen that it differs from all similar substances: thus, from albumin by not being coagulated when heated, and by not precipitating silver nitrate; from gelose, by being soluble in dilute alkalis, but insoluble in boiling water, gelose is just the reverse; from gelatin, by giving no reaction with tannin; from starch, by not reacting with iodine; from dextrin, etc., by being insoluble in dilute alcohol and dilute mineral

acids. The purest form of algin is the precipitate produced by a mineral acid. It dries to a hard horny substance.

The composition of this substance is still obscure, for although the compounds with calcium, aluminium, barium, and lead have been investigated, no uniform results have been obtained. The sodium carbonate appears to be unaltered in its compound with algin; the carbonic acid is, however, only given off by treating with excess of hydrochloric acid, and heating. When a solution of algin is precipitated by acid, redissolved in alkali, and this treatment repeated, decomposition seems to go on continually. The author then suggests various uses for algin, founded on the properties above described; mixed with starch it could be used as a stiffener for fabrics, or alone as a dressing material, or as a mordant. It would also form a useful food. It can be used to prevent boiler incrustations, for fining wines and spirits, for insulating electrical appliances, etc. It can also be used to replace horn for the manufacture of various moulded articles.—*Jour. Chem. Soc.*, 1883, p. 943; *Chem. News*, xlvii, p. 254 and 267.

THE TREES YIELDING BENZOIN.

By E. M. Holmes, F.L.S.

The benzoin which enters into English commerce includes four varieties named respectively Sumatra, Palembang, Penang and Siam benzoin. These exhibit certain characteristic appearances by which they are easily recognized, and three of them, namely, Sumatra, Penang and Siam benzoin, are probably derived from three distinct plants. The botanical source of Sumatra benzoin was determined by Dryander, and an account and figure of the Plant were published by him in the *Philosophical Transactions*, for the year 1787, lxxvii., p. 303, but the trees which yield the other varieties have as yet never been identified with certainty. The Penang benzoin is similar in appearance to the Sumatra kind, but it has an odor which is quite distinct and resembles that of storax. It is in all probability not produced by *Styrax benzoin*; but we have as yet no accurate information concerning the botanical source of Penang benzoin. The authors of "Pharmacographia" point out that it may perhaps be the produce of *Styrax subdenticulata*, Miq., since this tree, which occurs in West Sumatra, has the same name, "Kajoe Kéminjan," as *S. benzoin*, and

Miquel remarks of it *an etiam benzoiferum*? That these two species should receive the same native name in Sumatra is not surprising since the leaves are very similar in shape and appearance and the fruit of *S. subdenticulata* apparently only differs from that of *S. benzoin* in being obovate instead of globular and depressed.

Palembang benzoin resembles the Sumatra sort in odor and differs from it chiefly in its much greater transparency and in yielding, as I am informed, a larger percentage of benzoic acid. It frequently contains moisture and if recently imported specimens are placed in a bottle they soon become mouldy. Concerning the tree which yields Siam benzoin, nothing definite has hitherto been ascertained, although as long ago as 1859, Mr. D. Hanbury wrote to Sir R. H. Schomburgh, asking him to investigate the origin of the resin, and to find out whether the tree which yielded it was really *Styrax benzoin*. Nor have subsequent inquiries been more successful. The only account extant of the mode of collection of Siam benzoin is that given by Sir R. H. Schomburgh, who was British Consul for some years at Bangkok. He, however, never visited the region producing benzoin and could therefore only give information at second-hand. He represents that the bark is gashed all over and that the resin which exudes collects and hardens between it and the wood, the former of which is then stripped off. The authors of "Pharmacographia," remark that it is evident that all Siam benzoin is not thus obtained. Schomburgh adds that the resin is much injured and broken during its conveyance in small baskets on bullocks' heads to the navigable parts of the Menam river, whence it is brought down to Bangkok.

The state of our knowledge of Siam benzoin being thus imperfect, it occurred to me to write to Mr. R. Jamie, of Singapore, to ask him for information on the subject. This gentleman takes great interest in all that relates to pharmacy, and has, I believe, been a liberal contributor to the Museum of the North British Branch. A few weeks ago I received from him a box of specimens for the Museum of the Pharmaceutical Society, containing amongst other interesting and valuable donations some sections of the trunk of the Siam benzoin tree, and herbarium specimens of the leaves, but unfortunately neither flowers nor fruit; also specimens of the Sumatra benzoin tree with leaves, flowers and fruit. In addition to these specimens he has contributed some interesting information, which I have taken this early

opportunity of laying before you. With regard to the Siam benzoin plants Mr. Jamie writes:

"My friend, Captain Hicks, of Bangkok, kindly procured them after very great difficulty from his friend living in the district where the gum benzoin trees are found, and he writes as follows:—'According to your request I had fifteen gum benjamin plants brought over from Suang Rabang, one of the northern Laos states tributary to the King of Siam, but after a deal of shifting and removing baggage on bullocks, twelve of them withered up; however, I have succeeded in getting three of them brought to Chung-mai; these I now send you. The one in the flower pot seems to be thriving remarkably well, but the other two in bamboo joints I have my doubts about. I also send you some sections of wood with the bark attached, and here and there you will find the gum sticking on the wounds and incisions made by the natives. The flowers, I am sorry to say, I could not get, as the trees have already flowered. From reliable information the tree is indigenous in all the northern Laos states, but grows luxuriantly in Suang Rabang and all along the belt of mountains in this province.'

"In the months of April and May the leaves begin to wither and fall off, and the natives then make incisions in the bark, and after a short time a lot of milky substance exudes and soon hardens; the gum then dries on the incisions and falls to the ground, which is swept daily and watched so that no earthy matter gets mixed up with it.

"The tree attains from 3 to 6 feet in circumference, and has a long trunk throwing out branches on the top; after six years' growth it can be bled. The flowers are attached to the small branches close to the leaves and begin to flower in June. The tree throws out shoots from the roots, and can be propagated by cuttings. The natives also say that afer the flowers fall off, in a short time a lot of young plants spring up.[1] The gum is a considerable article of traffic, in fact a monopoly, fetching a good price in the Bangkok market. It is used generally for fumigating sick rooms and making scented water. Large quantities generally find their way to Bangkok, being brought overland on oxen to Sawaryaloke, Pitchal, and other Siamese provinces, and are exported to Europe by several mercantile firms."

Of the three young plants above mentioned, one was given by Mr. Jamie to the Curator of the Singapore Botanical Gardens to forward

[1] This evidently means that the seeds quickly germinate as is the case with those of the Sumatra benzoin tree.

to Kew, a second was planted in Mr. Jamie's own garden, and the third died.

The twig which I now exhibit was taken by Mr. Jamie from the young plant in his garden. The specimen sent to Kew is still living and seemed to be in a healthy state when I saw it a fortnight since. Judging from the appearance of the plant at Kew and from the leaves sent by Mr. Jamie, the Siamese benzoin tree is probably a distinct species, although nearly allied to *S. benzoin*, Dry. The leaves are rather thinner, the lateral veins are fewer in number and the veinlets more prominent beneath, but it is necessary to wait until flowers and fruit are obtained before the exact species to which it belongs can be ascertained. Mr. Jamie has now the two growing together in his garden, and remarks in his letter, "Judging from what I have seen of the two kinds growing together, they are different."

I have compared the specimens of the Styarx benzoin tree from Mr. Jamie's garden, with Dryander's original specimen in the British Muesum, and they correspond exactly.

Concerning this tree Mr. Jamie writes:—"The Singapore grown tree is thought to be from Palembang,[1] it is about 30 feet in height, and the branches are all at the top. The circumference of the trunk is from 14 to 16 inches. It flowers in March and the fruit does not take long to mature, then it falls off, producing seedlings in abundance at the foot of the tree. How old this tree may be is rather difficult to determine, but it must be over thirty years at the least."

The tolerable certainty that in a short time flowers and fruit of the Siam benzoin tree will be obtainable, and that the source of the drug can then be definitely set ar rest, must be my excuse for bringing incomplete information before you. I need none for bringing the admirable specimens presented by Mr. Jamie under your notice.

Sulpho-carbolate of sodium for bee stings.—Dr. Thos. Edwards, in the *Lancet*, September 22, 1883, says that in a case of great swelling of the face from the sting of a bee he gave fifteen grains of this drug in an ounce of water, every four hours, with most gratifying results.—*Med. and Surg. Rep. Oct.* 27.

[1] If so, then, it supports my supposition that Palembang and Sumatra benzoin are produced by the same tree.

DIASTATIC FERMENT OF BACTERIA.

By J. Wortmann.

Recent investigations have conclusively established the universal occurrence of diastatic ferments in different parts of plants, and have thrown a new light on the processes of nutrition and fermentation.

According to earlier observations, the presence of diastase in the plant was limited to germinating wheat or barley, and knowledge in regard of its wider diffusion has been advanced by the recent works of Gorup-Besanez, Will, Kranch, and especially Baranetzky. The researches of Musculus, E. Schulze, O'Sullivan, and others, have afforded an insight into the quantitative relations and the modifying external factors of temperature and acidity concerned in the action of diastase in the transformation of starch into glucose.

Having in view the action of bacteria as causes of putrefaction or fermentation in which the destruction of the putrescible or fermentescible body is accomplished by the appropriation for the purpose of nutrition by the bacteria of constituent nitrogen or carbon, the question may be asked—can bacteria also obtain their carbon from starch, just as by the researches of Pasteur and Cohn they have been proved to be capable of obtaining it, not only from sugar but from ammonium tartrate? Are bacteria, by the secretion of a starch-transforming ferment analogous to diastase, or in any other but not clearly defined way, capable of transforming starch into soluble, diffusible, and nutrient combinations? Notwithstanding the numerous investigations into the chemical and physiological relations of bacteria, very little has been made out in regard to their action on starch—a circumstance from which it may be presumed that the solution of starch by bacteria can be effected only in certain instances. In his work, "Ueber die niederen Pilze," Naegeli refers to the secretion by these organisms of a special energetic ferment capable of changing milk-sugar into fermentescible sugar, starch and cellulose into glucose, and of dissolving coagulated albumin and other albuminates, and Sachsse alludes to the circumstance of starch solution undergoing no change so long as it is protected from the influence of organic germs by which otherwise it quickly undergoes transformation.

Some experiments, made by the author in the summer of 1881 with milky juices, led him to believe that certain appearances of corrosion exhibited by the starch granules present must be due to the action of

bacteria. The result of further precise experiments, undertaken to decide this point, led to the conclusion that bacteria are capable of drawing their supply of carbon from starch, and that the appearances of solution or corrosion exhibited by the solid starch granules are identical with those caused by the action of diastase or saliva.

The method used by the author was as follows: To about 20 or 25 cc. a mixture of inorganic salts (sodium chloride, magnesium sulphate, potassium nitrate, and acid ammonium phosphate) in equal proportions was added to the extent of 1 per cent. The same quantity of solid wheat-starch was then added, and the liquid then inoculated with one or two drops of a strongly bacterial solution, shaken, corked, and allowed to remain in a room at a temperature of 18 to 22°. [*Bacterium termo* was the predominating organism in the inoculating fluids employed.] In from 5 to 7 days, the first signs of commencing corrosion of the starch grains become visible, the larger grains being the earliest attacked, and much later, when these have almost completely disappeared, the lesser granules are attacked.

In a second series of experiments soluble starch was substituted for the solid form, the progress of the reaction being watched by the aid of iodine. Samples taken from time to time exhibited at first the blue color, then violet or dark red, passing to wine-red, and, finally, when the starch had disappeared, underwent no change.

As Baranetzky has shown, the starch granules of different kinds are acted on with very unequal rapidity by the diastatic ferments of plant juices, the strongest ferment of all—malt diastase—being well known to have no perceptible influence, even after long exposure, on solid potato-starch granules, whilst wheat and buckwheat are dissolved with facility.

Experiments were made with a view to ascertain whether the action of bacteria on starch was analogous; in these wheat-starch grains are shown to be by far the most readily attacked by bacteria—in several instances having even completely disappeared before other sorts of starch were attacked. Differences were also noticed in regard to the times when palm-starch, canna-starch, turmeric-starch, and iris-starch were attacked, their degree of resistance being in the order given. Potato-starch alone resisted attack. When wheat-starch in the solid state was mixed with starch solution or with starch-paste, the solution became entirely (and the paste in greater part) changed before the solid granules were attacked.

With regard to this unequal power of resistance shown by different kinds of starch, the author concludes from his further observations, that the difference of rapidity with which a given kind is attacked and dissolved by a ferment is inversely proportional to its density, provided always that the granules in qnestion are entire and uninjured by cracks or fissures. In the same way are explained the differences in point of time in which granules of the same kind are sometimes observed to undergo change accordingly as these are intact or otherwise.

The cause of potato-starch or of bean-starch, and, even under certain conditions, wheaten starch resisting attack, in spite of the abundant presence of bacteria, is apparently to be sought for in the fact that other more easily accessible sources of carbon nourishment were also present, certain albuminoid constituents of the potato slices or of the beans employed affording this more readily than the starch granules, just as in the experiments, above cited, with wheaten starch solution, and solid wheaten starch; the former was preferentially attacked; only after all, or at least the chief portion of the albuminoids present, had been used up was the starch in these cases attacked.

Experiments were also made with the same results in which, after Cohn, ammonium tartrate was employed along with starch as a nutrient medium for the bacteria, with the result that so long as even a trace of this salt was present with the starch, the latter was not attacked by bacteria in the slightest degree, but on its disappearance, appearances of solution became at once visible in the starch granules. Another point was also established in the course of these experiments, that if air is excluded, no appearances of corrosion or solution of the starch granules are manifested.

Other researches were made to answer the problem as to whether the nature of this action of bacteria on starch was such that an unformed ferment analogous to diastase was secreted by those organisms to which the corrosive appearances may be ascribed, these being, as already stated, precisely similar to the resulting action of diastase itself.

That the starch in the process became changed in part to glucose was easily ascertained by testing with Fehling's solution, and a detailed series of experiments, made with a view of eliminating, if possible the ferment itself, yielded evidence showing that bacteria possess the remarkable property of producing a starch-transforming ferment only when no source of carbon other than starch is at their

disposal, and this ferment is incapable of changing albumin into peptone, just as in the case of diastase. It is well known that the pepsin of gastric juice acts only in an acid medium. The plant juices which possess a diastatic property exhibit likewise a more or less acid reaction, so that as Baranetzky assumes, the co-operation of an acid in the case of diastase is a necessary condition of its activity. The solutions in which starch in one or another form was submitted to the action of bacteria were always slightly acid, due to the presence of acid ammonium phosphate, and when the solutions were purposely made neutral, the process of starch transformations went on more slowly. Detmer some time since has shown that addition of small quantities of citric acid to a solution containing diastase, hastens its action on starch. The author's observations are in harmony with this, but in addition show that the process of starch transformation by bacteria is capable of going on in the absence of acid, and that the bacteria do not yield any acid in the process. The results of the author's researches may be briefly recapitulated.

1. Bacteria are capable of acting on starch, whether in the solid state, as paste, or in solution, in a manner analogous to diastase.

2. As in the case of diastase, different kinds of starch are attacked by bacteria with different degrees of rapidity.

3. The action of bacteria on starch is manifested only in the absence of other sources of carbon nutriment, and when access of air is not prevented.

4. The action of bacteria on starch is effected by a ferment secreted by them, and which, like diastase, is soluble in water, but precipitable by alcohol.

5. This ferment acts precisely as diastase in changing starch into a sugar capable of reducing cupric oxide, but not possessed of peptonising properties.

6. The ferment itself is also capable of acting on starch in the absence of oxygen.

7. The ferment is secreted by the bacteria also in neutral solution of starch, and exerts its influence under these conditions.

8. This influence is expedited in slightly acid solutions.

The author concludes his paper with speculations as to the conditions under which bacteria are capable of generating this amylolytic (diastatic) ferment, instead of the ordinary peptonising one.—*Jour. Chem Soc.*, 1883, p. 390; *Zeitschr. Physiol. Chem.*, vi, 287–329.

OLEUM RUSCI.[1]

By Peter MacEwan.

During the past two or three years a demand has sprung up for oleum rusci, and considerable doubt has been expressed as to its nature and quality, articles of different characters having been supplied.

It would appear from the name that the article has some relation to butcher's broom (*Ruscus aculeatus*), but we learn from various sources that it is merely one of the synonyms of the empyreumatic oil of common birch (*Betula alba*). Thus the Danish Pharmacopœia, 1805, has the oil under these names, "Oleum betulinum, oleum rusci, oleum brusci," the latter being another name for the butcher's broom. These names are quoted in the Norwegian Pharmacopœia of 1854 under "Pix epidermidis betulæ albæ;" more recently we find that Hager uses the synonym for the birch tar oil, and the Dutch Society for the Advancement of Pharmacy have it as "Oleum betulæ rectificatum, oleum rusci."[2]

I can find no explanation of the association of the words "Ruscus" and "Bruscus" with this birch product, and can offer none, unless "Brzoza" (Polish for birch) may have been corrupted into "Bruscus" and thence into "Ruscus." At all events it is beyond dispute that oleum rusci is birch tar oil.

The oil has been long known as that used in currying Russia leather, to which it imparts the peculiar odor and lasting properties that are so much admired; it is chiefly made in Russia and Poland. The bark, and sometimes the rootlets and twigs, are subjected to dry distillation, the retort being of clay and connected by wooden pipes to a receiver placed in the earth. Hager states that this oil is a thickish liquid of a reddish-brown or brown-black color, peculiar empyreumatic odor, and sparingly soluble in water, but soluble in alcohol and ether to a great extent. The re-distilled oil of the Dutch Society is said to be a red-brown volatile oil, sp. gr. 0·800–0·987, soluble in an equal weight of alcohol and imparting an acid reaction to water. Birch bark has a mildly fragrant odor, and by gentle heating yields a sublimate of birch camphor or betulin ($C_{36}H_{60}O_3$). This body, as obtained from the bark by exhaustion with alcohol, is odorless and tasteless, but when subjected to a high temperature (about 258°C.) it gives off vapors smelling

[1] The greater portion of this paper was read before the Edinburgh Chemists' Assistants and Apprentices' Association, November 7, 1883.

[2] *Pharm. Journ.* [3], xiii, 10.

strongly like Russia leather. This change will very probably be effected in the distillation of the empyreumatic oil from the bark, thereby accounting for its distinctive odor. Independently of its use in currying, the oil is held in high esteem by the Russian peasantry as a household remedy for all diseases, as well as by the medical practitioners in the treatment of skin diseases, rheumatism and the like; it is similarly used in Germany, whence it is exported. Its reputation has traveled to this country, but I am afraid that the remedy has not accompanied the reputation.

Through the kindness of Mr. Holmes, Curator of the Museum of the Pharmaceutical Society, I have received a small portion of a veritable specimen brought from Russia by Mr. Greenish, of which Mr. Holmes gives me the following particulars:

"Specimen 511 b" (Museum Catalogue) "is a black empyreumatic fluid resembling in odor the liquid known as 'essence of smoke,' used for curing hams; after a mere trace of it has been rubbed on the hand an odor like Russia leather is perceptible. The fluid, when caused to cover the side of the bottle in thin layer, is black with a brown tinge. . . . I believe the pyroligneous oil of birch is sometimes prescribed under the name of 'ol. rusci.' . . . Dr. Symes tells me that there is a brown oil of birch which he believes is only the dark oil re-distilled."

There is no doubt whatever that oil similar to Mr. Greenish's is extremely rare in this country, although the oil mentioned by Dr. Symes is readily procurable; but there are others which can only be called substitutions and sophistications, and of these I append particulars I have only had small samples given me, and of these only No. 1 seems favorable for further investigation.

No. 1. Red-brown "re-distilled oil," sp. gr. 0·941. Exposed for fifteen minutes on a water bath it was reduced to half its original bulk. Residue resembled Mr. Greenish's specimen; betulin odor intensified, but more pyroligneous than the veritable specimen.

No. 2. Red-brown "re-distilled oil," sp. gr. ·876. (This oil is more fragrant than the genuine or No. 1, and suggests "doctoring.") On a water bath, the greater part volatilized within ten minutes, leaving a small residue of an oily nature and strong pyroligneous odor.

No. 3. A thick tar, black and bituminous. Odor somewhat like huile de cade. This was not examined, Hager stating that very thick varieties should be rejected.

No. 4. An amber-colored oil, sp. gr. 0·891. Odor like that of common spirit of tar (ol. picis rect.). On the water bath a small quantity was vaporized within ten minutes, leaving a mere trace of resinous matter destitute of betulin odor.

Owing to my portion of Mr. Greenish's sample being extremely small, I have only been able to take its sp. gr. roughly and found it to be 0·943; this, however, requires verification. On the water bath it leaves a thick and tenacious black residue having the betulin odor. The only specimen which compares favorably with it is No. 1, which answers the description of the re-distilled oil of the Dutch Society. It is much thinner than the genuine oil, and the pyroligneous odor is stronger; but a trace of it, treated as directed by Mr. Holmes, gives a powerful betulin odor in the course of fifteen minutes. This variety is readily obtainable. From the behavior of No. 2 I am inclined to think that it is a "made-up" oil, since the fragrance entirely disappears on the water bath. No. 4 is the "ol. rusci" which has been so largely supplied to pharmacists, and several eminent dermatologists have formed their opinions of the value of the remedy from their experience with this variety. It is not surprising, therefore, that they have reverted in some cases to old-fashioned remedies such as huile de cade. This is to be regretted, for ol. rusci has been found useful in the hands of continental practitioners, and if a demand were here made for the genuine oil, means would not be wanting for obtaining it.

I cannot conclude without expressing my thanks to Mr. Holmes for his assistance, and to Messrs. Crowden and Hill for specimens.—*Phar. Jour. and Trans.*, Nov. 17, 1883.

VARIETIES.

THE NEW HYPNOTIC, PARALDEHYD.—This agent promises to be an important addition to our resources for producing sleep. Paraldehyd is a polymeric modification of aldehyd, and is expressed by the formula $C_6H_{12}O_3$. It is colorless; in odor resembling chloroform, with a sharp taste. It is administered in doses of 2-6 gm., preferably in a sweetened ten per cent. solution. Its immediate effect is to produce a perfectly natural sleep of two to six hours duration, from which the subject awakes without any sense of distress, headache, dullness, or nausea. Its signal advantage over chloral hydrate is that it does not weaken the heart's action, nor impede the respiration or circulation in any degree; nor does it establish the necessity for its continued use, thus forming a "habit."

The sole objection to paraldehyd seems to be that it gives an unpleasant

odor to the breath, which not only is noticeable in the room, but remains for twenty-four hours.

The experiments upon it up to the present have chiefly been reported from the hospitals of Milan, Breslau, and Andernach. We have learned of none in the United States.—*Med. and Surg. Rep., Nov.* 17.

TINCTURA IODOFORMI COMPOSITA.—Dr. G. Beck's formula, slightly modified, is as follows: Dissolve iodoform 8 gm., balsam of Peru 3 gm., in alcohol 20 gm., and add potassium iodide 70 gm., glycerin and water, each, 35 gm.—*Med. Record.*

DR. FOTHERGILL'S ASTHMA MIXTURE.—℞. Tinct. lobeliæ, ℥v; ammonii iodidi, ʒij; ammonii bromidi, ʒiij; syr. tolutani, ℥iij. M. Teaspoonful every one, two, three, or four hours. This gives relief in a few minutes, and sometimes the relief is permanent.—*Weekly Medical Review, Oct.* 13.

ASPIDOSPERMA QUEBRACHO.—The author sums up as follows ("El Sentido Catol. en las Ciencias Med.," March 1st, 1883)—1. *Quebracho* diminishes the frequency of the respirations and cardiac contractions. 2. Its action appears to be principally directed on the heart, strengthening and regulating its contractions, either directly or by the influence of the nervous system. 3. This action is evident and immediate. 4. It is the only remedy which has a manifest antidyspnœic action. 5. In nervous dyspnœas it must be tried in a greater number of cases to judge of its action. 6. It probably produces the same effect in dyspnœa from acute affections of the thoracic organs. 7. The prolonged administration produces no alteration in other organs or functions.—*The London Medical Record*, May 15th, 1883.

TRICHLORPHENOL.—Dr. N. O. Yurinsky, of Alexander Town Hospital, St. Petersburg, reports, in the "Ejened. Klin. Gazeta," 1883, No. 5, pp. 73–5, four cases of erysipelas (three idiopathic, one traumatic) which he highly successfully treated by painting the affected parts with a solution in *glycerite* of *trichlorphenol* (5 to 10 per cent.). The painting was repeated twice daily; each time the parts were freshly covered with cotton-wool retained by means of a roller. In two of the cases, swelling, redness, tension and tenderness of the integuments disappeared after two paintings (on the second day of the treatment); in the remaining two patients, after six. In all the cases, the erysipelatous process did not spread after the first application. The temperature fell to standard in one of the cases on the second day of the treatment; in one, on the third; in the other patients, who suffered at the same time from relapsing fever, no change in the temperature was observed. The author eulogizes the powerful antifermentative and antiseptic properties of trichlorphenol, and emphatically invites all professional brethren to give a more extensive trial to such a simple plan of the treatment of erysipelas described above.—*The London Medical Record; Quart. Therap. Rev.*, July, 1883.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 20, 1883.

In the absence of the president, Dr. A. W. Miller was called to the chair.

The minutes of the last meeting were read and approved.

Dr. Miller stated that he had talked to one of the manufacturers of the American *Magnesium Carbonate*, who stated that it was their aim to have the case, which contains 480 blocks of the magnesia, weigh a little more rather than less than 120 pounds, but owing to the varying density of the magnesian carbonate and the variable amount of water which the magna contained, it was almost impossible to make these blocks of uniform weight.

Mr. J. W. England, in response to the call for written communications, read an interesting paper upon *Syrup of lactucarium*. The paper was accompanied with specimens of the syrup made in accordance with the pharmacopœia of 1880, and by the formula which he indicated in his paper. He also directed attention to *powdered quartz* as a most desirable material for comminuting resinous matters of a character like lactucarium. The reading of the paper elicited a number of inquiries, and a vote of thanks was passed to Mr. England. The paper was referred to the Committee on Publication.

Professor Maisch presented to the College, for the Cabinet, a specimen of *tupelo root*, the *Nyssa grandidentata*, forwarded by Hiland Flowers, Ph. G., from Louisiana; its extreme lightness makes it valuable for forming floats for fishing nets, and it has been used in surgery for the fabrication of "tents," its expansive power rendering it quite suitable for this purpose. Professor Maisch stated that he had received, about four years ago, inquiries for Nyssa root from Europe, and then he could only obtain the roots of Nyssa multiflora and uniflora, growing in the Northern States, and the wood was far more dense, and unsuited for the purpose of making tents.

Professor Trimble called attention to a small volume entitled "Pocket-book for Chemists," by Thomas Bailey, Ass. R. C. Soc., containing tables of equivalents, the rules for converting metric in grain weights, and a very large amount of information of great value to manufacturing chemists and others.

Dr. A. W. Miller read a poetical dissertation on Hamamelis, or Witch Hazel, which was received with satisfaction.

Professor Maisch exhibited a specimen of the fruit of the Japanese persimmon, *Diospyros Kaki*, handed to him by Miss Hayhurst, Ph.G., M.D. The beauty of the specimen caused it to be much admired; it is of a bright red color, and somewhat like a thick tomato, but rounder, with only four slight grooves on its sides. Although a native of Japan, the specimen shown was grown in Florida.

Professor Maisch alluded to the fact that the *Spigelia* which was commonly sold twenty-five years ago had entirely disappeared from the market, and its place taken by much smaller roots of Spigelia marilandica, and by one or more species of Phlox, principally P. Carolina. A pharmacist of Georgia informed Prof. Maisch, when in Georgia, several years since, that the reputation of Spigelia was built upon the results obtained by the use of the phlox. The late Mr. Twining, an extensive manufacturer of fluid

extracts, had also stated to Dr. Miller that he had successfully used the fluid extract of pink root (phlox) in his family before he made extract from it for the trade. Some of the venders and large herb dealers quote both true and false pink root, as they are called, on their lists. Prof. Maisch said that different species of Phlox as well as the Spigelia marilandica were known in the Southern States, as "Carolina pink," and it was not improbable that the root of Phlox might have been first employed, and that after its virtues had been ascertained the root of the officinal pink, Spigelia, was used.

Dr. Miller said that physiological experiments were extremely desirable, in order to decide the question of efficacy of both drugs.

There being no further business, on motion, adjourned.

J. S. WIEGAND, *Register.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

CALIFORNIA COLLEGE OF PHARMACY.—The eleventh annual Commencement took place at Metropolitan Hall, San Francisco, on the evening of November 19, when W. T. Reid, A. M., President of the University of California, conferred the degree of Ph. G. upon the following candidates: F. Arthur Beckett, *Hydrobromic Acid;* Michael H. Dignan, *Analysis of a Sulphuretted Mineral Water;* Charles R. Fitzell, *Humulus Lupulus;* John A. Green, *Melaleuca Hypericifolia;* Morgan L. Jones, *Agave Americana;* Harry W. Korper, *Boldoa Fragrans;* Frederick G. Lindsay, *Schinus Molle;* Berkley W. Moore, *Pyrethrum Cinerariæfolium;* Frank T. Rimpau, *An Assay of Ore;* Paul H. Reilly, *Tannic Acid;* Emile Roturier, *Piperidine;* Robert W. Skinner, *Semen Bardanæ;* Henry A. Wall, *Erythroxylon Coca.* Addresses were made by S. P. Sprecher, D. D., Prof. W. M. Searby and F. A. Beckett, Ph. G. The faculty prize, a gold medal, was awarded to M. L. Jones; the chemistry prize, a copy of Cyclopædia of Chemistry, to H. W. Korper, and the junior prize, lecture tickets to senior course, to George Oberdeener.

ALUMNI ASSOCIATION, CALIFORNIA COLLEGE OF PHARMACY.—The annual meeting was held at the College hall, on the evening of November 8. Mr. F. Lengfeld, senior member of the Executive Committee, presiding. The reports of the various officers and committees were read and accepted, officers for the next year were elected, and subjects concerning the welfare of the College were discussed; among others that of the separation of the College from the California Pharmaceutical Society, and joining it to the University of California on the same basis as the Medical and Dental Departments received the approval of most of the members present, as did also that of raising the percentage necessary for graduation to the old standard of 66⅔ per cent. instead of 60 per cent. The officers for the ensuing year are: President, D. M. Gove; Vice-President, S. L. Leszynsky; Secretary, D. M. Fletcher; Treasurer, Chas. M. Troppman; Executive Committee, F. Lengfeld and J. H. Barbat to serve one year, W. B. Beckett and A. L. Scholl, to serve two years.

THE NEW HAMPSHIRE PHARMACEUTICAL ASSOCIATION held its tenth annual meeting October 9, in Concord. The usual routine business was transacted, several papers were read and the following officers elected: President, F. H. Chapman, Franklin Falls; Vice-Presidents, J. O. Burbank and S. F. Sanderson; Secretary, G. F. Underhill, Concord; Treasurer, H. B. Foster, Concord. The next meeting will be held in Lancaster, the date to be fixed by the Executive Committee.

THE ILLINOIS PHARMACEUTICAL ASSOCIATION held its fourth annual meeting in the hall of the Representatives, at the State Capitol, in Springfield, October 9 and 10. President, Henry Biroth, in the chair. Alderman Fleury welcomed the Association on behalf of the city, and Governor Hamilton on behalf of the State. The President delivered his annual address, and the Secretary and various committees presented their reports. Several amendments to the by-laws were adopted, among them one striking out the clause for not admitting to the exhibition "proprietary and patented medicines, all medical preparations the complete working formula for which is withheld, and such preparations as are offered under other than their proper scientifically recognized names." The surplus in the hands of the Entertainment Committee, amounting to $412.42, was received from the Chicago druggists, to be invested for the purpose of annually awarding the "Chicago prize" for the best paper on a subject to be determined by the Committee on Queries. A Committee of one on Progress of Pharmacy was appointed to report, in condensed form, all information possessing a special practical interest to the pharmacists of Illinois. Messrs. P. J. Singer, of Peoria, and E. H. Sargent, of Chicago, were elected honorary members. The officers for the next year are: President, H. Le Caron, Braidwood; Vice-Presidents, Hugo W. C. Martin, Chicago; R. N. Dodds, Springfield; F. A. Stevens, Newton; Secretary, T. H. Patterson, Chicago; Treasurer, M. Williams, Taylorville; Local Secretary, J. E. Espey, Bloomington; Executive Committee, W. P. Boyd, Arcola, Chairman; A. A. Brown, Sterling; H. H. Green, Bloomington; State Board of Pharmacy, A. W. H. Reen, Peoria; H. Schroeder, Quincy; A. G. Vogeler, Chicago. Several papers were read and the Association finally adjourned to meet next year in Bloomington, on the last Tuesday of September.

MISSOURI STATE PHARMACEUTICAL ASSOCIATION.—The Association held its fifth annual meeting, October 23d to 25th, inclusive, in the Board of Public School Directors' Room, Polytechnic Building, St. Louis, Mo. After President M. W. Alexander had delivered an address and a new constitution had been adopted, officers for the ensuing term were elected, as follows: President, O. A. Wall, St. Louis; Vice-Presidents, H. C. Churchill, Windsor; J. W. Llewellyn, Mexico; J. A. Gallagher, Kansas City; Permanent Secretary, G. H. Chas. Klie, St. Louis, Mo.; Treasurer, Prof. J. M. Good. A motion was adopted that in future the newly elected officers are not to be installed until immediately previous to adjournment of the meeting at which they had been elected. The name, "executive committee," wherever it occurs in the constitution was changed to "council." The following gentlemen were elected members of the council: "F. W. Sennewald, St. Louis; D. T. Wooldridge, Boonville; M. W. Alexander, St.

Louis; Geo. Ude, St. Louis, and Dr. A. R. Edmunds, Miami. The various standing committees were appointed, and the following papers were read: by Prof. J. M. Good, on "Articles Dismissed from the Pharmacopœia;" by Prof. O. A. Wall, one on "Spurious Star Anise," and another on "Spurious Male Fern;" by Prof. C. O. Curtman, on "Artificial Production of Cold and Ice;" by Prof. Oscar Oldberg, on "The Importance of the Vegetable Materia Medica;" by F. W. Sennewald, on "Syrup of Orange Peel;" and by G. H. Chas. Klie, on "Kairin." The Association gained nearly a hundred new members, mostly St. Louisians, at this meeting. After installing the new officers, adjournment was had. Next meeting will be held, three P. M., the second Tuesday of June, 1884, at Brownsville; the Local Secretary is C. M. Kelly.

EDITORIAL DEPARTMENT.

CORRASSA COMPOUND.—We have lately again received inquiries concerning the asserted ingredients of this fraud, by means of which an adroit swindler has for years fleeced thousands of credulous human beings. It is true the fraud has been often enough exposed by letter and in print; but copies of the recipe with barbarous names seem to be still extant and to turn up occasionally. A full and complete exposure of this fraud was published in "The Therapeutic Gazette," of Detroit, April 15th, last, and previously in the "Agents' Herald," of Philadelphia. From the evidence there presented it is shown that the "Rev. Jos. T. Inman" is an Englishman, by the name of Allison, afterwards associated with another Englishman named Hearne. While Station D of the New York Post Office was located in the Bible House in that city, the precious pair had letters addressed there under the assumed name, thus creating in the minds of dupes the impression that the "Rev." was really a clergyman and was also connected with the American Bible Society; but there was no possibility of compelling the dropping from the advertisements of the words "Bible House" until after the sub post office had been removed from that building. The originator of the fraud is said to have gained over $200,000 in the infamous business and to have lived in high and fast style. His pretended recipe was as follows:

Ext. of corrassa apimis 8 drams, ext. of selarmo umbelifera 4 drams, powdered alkermis latifolia three drams, ext. of carsadoc herbalis six drams.

After the analysis of this compound by Mr. F. M. Goodman in 1871 (Chicago Pharmacist, Sept.; Am. Jour. Phar., Nov.), the ingredients appear to have been somewhat changed, as will be seen from the analysis made by Dr. A. B. Lyons, published in the "Therapeutic Gazette." We place the approximate results of the two investigations side by side:

Powdered gentian	about	15 parts (L.)	8 parts (G.)	
Powdered licorice	"	15 "	...	
Powdered sugar	"	50 "	24	"
Sodium bicarbonate	"	17·5 "	...	
Powdered cochineal	"	2·5 "	1 part.	

The price charged for about 2½ oz. of this mixture was $3.30 by express, or $3.50 by mail, including postage.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Elements of Chemistry; for the use of Schools, Academies and Colleges. By Edwin J. Houston, A.M., Professor of Natural Philosophy in the Central High School of Philadelphia. Published by Eldredge & Brothers, Philadelphia. Small 8vo, 444 pages. Price $1.50.

After an introductory on the nature of the chemical force, wherein the constitution of matter, atoms and molecules are described in their physical relations, as distinct from chemical changes, the author takes up in Chapter 2d, the theory of chemical combinations; dividing the subject under the heads of definite and multiple proportions, atomicity and quantivalence. Chapter 3d is devoted to the theory of substitution and chemical nomenclature; Chapter 4th to combination by volume, Gay Lussac's laws and the theorem of Avogadro.

Upon the subjects to which these four chapters are devoted, as upon corner stones, rests in a great measure the science of modern chemistry. Too much care could not therefore be taken in the compilation of a text-book for students, while condensing these subjects, to set them forth so as to be *clear* in the comprehension of the reader. Professor Houston has performed this somewhat difficult task in a manner which leaves but little to be desired.

Chapter 5th treats of crystallography. The text is illustrated by 51 excellent cuts, which are an invaluable aid to the study of this subject.

Part Second is devoted to the descriptive and experimental chemistry of the gases and haloids. The metals are divided into two groups, Perissad and Artiad, and are taken up in order of their quantivalence. This arrangement is calculated to assist the student in fixing these features of the elements in his memory. The series of experiments which are given, with good woodcuts of the arrangement of the necessary apparatus, will be found of great advantage to teacher and student.

Part Third. Organic chemistry. This wide field of survey is difficult to map out within the narrow limits of a text-book. After an introduction, giving the methods of elementary analysis of organic compounds, determination of molecular formula and weight, theory of substitution or replacement, empyrical and rational formula, the carbon compounds are classified according to the linking of the carbon nucleus, viz.:

1st. Single linked, or saturated compounds.

2d. Double or triple linked, or unsaturated compounds.

3d. The close chained carbon nuclei, or compounds containing more carbon than the preceding, sometimes called the "Aromatic group."

4th. Compounds of unknown constitution. In this class the author includes the alkaloids and albuminoids of vegetable origin.

Each section of the book is followed by a syllabus and questions for review.

The book is well printed, on excellent paper, and contains a copious index.

It will commend itself to teachers and students of chemistry. C. B.

Chemistry: General, Medical and Pharmaceutical, including the Chemistry of the U. S. Pharmacopœia. A Manual on the General Principles of the Science, and their Applications in Medicine and Pharmacy. By John Attfield, F.R.S., M.A., Ph.D., etc. Tenth edition, specially revised by the author for America. Philadelphia: Henry C. Lea's Son & Co., 1883, 12mo, pp. 727.

On the publication of the different American editions of Prof. Attfield's work, we have commented more in detail on its arrangement and contents, and on the appearance of this, the last edition, no further comments are necessary beyond stating the fact of its publication and that it embraces the latest developments of chemical principles and the various applications of chemistry in pharmacy. Intended for the use of the student, as well as for that of the pharmacist and physician, the work in the past has proved its great value, and in its present shape will be found to be an equally reliable guide. We notice that the typographical error in the U. S. Pharmacopœia in the directions for estimating the strength of hydrocyanic acid, as well as several others of minor importance, have been corrected. It is scarcely necessary to mention that the external appearance of the book is in keeping with its internal worth.

Chemistry: Inorganic and Organic, with Experiments. By Charles L. Bloxam, Professor in King's College, London, etc. From the fifth and revised English edition. With 292 illustrations. Philadelphia: Henry C. Lea's Son & Co., 1883. 8vo, pp. 738. Price, cloth, $3.75; leather, $4.75.

The general plan of this work remains the same as in previous editions, the evident object being to give clear and concise descriptions of all known elements and of their most important compounds, with explanations of the chemical laws and principles involved. Well established facts with their rationale, therefore, occupy the most conspicuous place, and theoretical speculations are admitted to a limited extent only; but the general principles of chemistry are thoroughly explained. Some changes have been made in the grouping of the various metals, and in the body of the work the advances made of late years in chemistry are fully incorporated. As heretofore, the illustrative experiment and chemical technology are prominent features of this work, and give it a special value. We gladly repeat now the opinion expressed about a former edition, that we regard Bloxam's Chemistry as one of the best treatises on general and applied chemistry.

Corrections of Typographical and other Errors contained in the new U. S. Pharmacopœia.

Such a list has been published under the supervision of the chairman, Dr. Chas. Rice, and may be obtained by those having copies of the Pharmacopœia, by addressing the publishers, Messrs. Wm. Wood & Co., New York, enclosing a two-cent stamp for reply.

Principles of Theoretical Chemistry, with special reference to the Constitution of Chemical Compounds. By Ira Remsen, Professor of Chemistry in the Johns Hopkins University. Second edition, thoroughly revised and enlarged. Philadelphia: Henry C. Lea's Son & Co., 1883. 12mo, pp. 242.

When the first edition made its appearance, in 1877, we welcomed it as a very valuable addition to literature; the more we have consulted it since that time, the more we have appreciated its value. A large portion of the book is devoted to the so-called structural or constitutional formulas, which are often freely used as a fashionable plaything; and such wholesale use to express something about which absolutely nothing is known, has tended to bring them into disrepute. Constitutional formulas are intended to express certain reactions, of synthesis as well as of decomposition, and to recall analogies. These points are lucidly discussed in the chapters on Definition of Constitution, and on Linkage of Atoms. In another place the author says: The formula CH_3—OH does not mean that hydroxyl (OH) is necessarily present in the compound, or that CH_3 is present, but that the different parts of the compound bear such relations to each other that when the compound is decomposed it acts as if the parts were united as the formula indicates; the formula suggests possibilities; it may not represent realities.

The value of the book depends, on the one hand, upon the ground which it covers, and, on the other hand, upon the impartial manner in which the various hypotheses are discussed from a purely objective standpoint. The book deserves to be placed in the hand of every student of chemistry.

Syllabus of Pharmacy Course, Department of Pharmacy, Massachusetts College of Pharmacy, Boston, Mass. By Edgar L. Patch, Ph.G., Professor of Theory and Practice of Pharmacy. Boston, 1883. 8vo, pp. 63.

The author states that this syllabus has been in part modeled upon that published by the late Prof. Procter in Proceedings of the American Pharmaceutical Association, 1858. Like the latter, it is divided into two parts, the first one comprising the study of the physical laws applicable to the various pharmaceutical manipulations, of the requisite apparatus and aids, the different classes of preparations, dispensing pharmacy, etc. The second part gives lists of the various drugs, arranged in groups, according to their most prominent constituents. These lists are arranged in tabular form, and generally contain the common name, the officinal name and preparations, the botanical source and habitat of plant. A further classification of the drugs comprised in each list has not been attempted, they being enumerated mainly in alphabetical order, although exceptions to this rule are by no means rare. Classifying drugs by their pharmaceutical affinities offers greater difficulties than their arrangement upon therapeutical grounds, chiefly because the nature of many of the medicinally unimportant or worthless principles are insufficently known, although their presence, like a number of so-called resins and pectin compounds, offer peculiar obstacles to the permanence or elegance of galenical preparations. Yet it would seem that belladonna, stramonium and hyoscyamus are pharmaceutically as closely related, as uva ursi and chimaphila, or nux vomica and ignatia, or as the different species of artemisia or the various chamomiles.

The author intends this syllabus to be the merest outline of a course of

study; yet even as such, valuable though it is, we should wish it to give, not fragmentary information, but such suggestions to detailed study and investigation, as were so happily embodied in Procter's syllabus, and we hope that in the next edition of his little work Prof. Patch may deem them worthy of incorporation as practical hints for the tyros in pharmacy.

Proceedings of State Pharmaceutical Associations, at the Annual Meetings held in 1883.

The following have been received:

Indiana, pp. 164. Next meeting at Evansville, on second Tuesday of May (date fixed by the constitution). Local Secretary, W. L. Johnston.

Louisiana, pp. 72. Next meeting at Baton Rouge, on the third Monday of May. Secretary, Ben. Lewis, New Orleans.

New Jersey, pp. 88. Next meeting at Asbury Park, on the third Tuesday of May. Local Secretary, Wm. C. Bakes, Ocean Grove.

New York, pp. 220. Next meeting in New York City, on the second Tuesday of June. Local Secretary, Prof. P. W. Bedford.

Pennsylvania, pp. 196. Next meeting in Wilkesbarre, on the first Tuesday of June. Assistant Secretary, Benjamin Armstrong.

Ohio, pp. 109. Next meeting in Cincinnati, on the third Wednesday of May (date fixed by the constitution). Local Secretary, W. J. Martin.

Texas, pp 32. Next meeting in Waco, on the second Tuesday of May. Local Secretary, W. B. Morrison.

Wisconsin, pp. 55. Appended is the second annual report of the State Board of Pharmacy, covering 24 pages more. Next meeting in Madison, on the first Tuesday of August. Local Secretary, C. H. Avery.

Handwörterbuch der Pharmakognosie des Pflanzenreichs. Von Prof. Dr. G. C. Wittstein. Breslau: Eduard Trewendt, 1883.

Dictionary of Pharmacognosy of the Vegetable Kingdom.

This work has now been completed by the publication of the seventh part and makes a handsome and well-printed volume of 994 pages. Of its arrangement we have spoken on former occasions. Now that the completed work is before us we may state that our expectation of its usefulness and reliability as a work of reference and information, has been fully realized. Its author the veteran pharmacist, Prof. Wittstein, is so well known in this country, that those pharmacists who are conversant with the German language, will hail his latest work with approbation. The index is divided into three parts containing the German, officinal and systematic names, so that each article can be easily referred to, It should be stated yet that the work forms a part of a series published under the general title of "Encyclopedia of the Natural Sciences," and embracing botany, mineralogy, physics, chemistry, etc. The different parts are written and edited by some of the most noted German scientists.

A Review of New Drugs and Remedies introduced during the Last Ten Years. By L. Wolff, M.D. Philadelphia, 1883. 8vo, pp. 36.

Reprint of a paper read before the Pennsylvania Pharmaceutical Association last June.

Die Pflanzenstoffe in chemischer, physiologischer, pharmakologischer, und toxikologischer Hinsicht. Für Aerzte, Apotheker, Chemiker und Pharmakologen, bearbeitet von Dr. Aug. Husemann, Dr. A. Hilger und Dr. Th. Husemann. Zweite völlig umgearbeitete Auflage. Berlin: Julius Springer, 1883. Dritte Lieferung. 8vo, pp. 665–984.

The Vegetable Compounds, in their Chemical, Physiological, Pharmacological and Toxicological Relations. For Physicians, Apothecaries, Chemists and Pharmacologists. Second edition, rewritten. Part Third. Price, 6 marks.

Part Third of this highly important work, now before us, deals with the Papaveraceæ, Cruciferæ, Clusiaceæ, Buettneriaceæ, Linaceæ, Terebinthaceæ, Sapindaceæ, Rhamnaceæ, Euphorbiaceæ, Umbelliferæ, Hamamelidaceæ and allied natural orders, including a portion of the myrtles. The most important medicinal plant of these orders is doubtless the poppy, and the various constituents of opium require about one-third of the pages, a prominence allotted them, which is merely commensurate with the importance of the drug yielding them. That nearly one-half of this space is required for morphine, shows that the authors, very judiciously, treat of the really valuable proximate principles in deserved detail. Between these and such principles, of which scarcely more than the name is known, or the existence of which is doubtful, there are many gradations; but all receive a more or less extended notice. The literature has been well collected and critically sifted as far as possible; in short, this part of the work is at least equal in completeness to the preceding parts.

Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures and Condition of the Institution for the year 1881. Washington: Government Printing Office, 1883. 8vo, pp. 837.

Besides what is indicated on the titlepage, the volume contains brief reports on the progress made during the year in the different departments of natural science; also a number of papers relating to anthropology.

Catalogue of the Phænogamous and Vascular Cryptogamous Plants of Worcester County, Mass. By Joseph Jackson. Worcester, Mass.: Worcester Natural History Society, 1883. 8vo, pp. 48.

A valuable addition to the literature relating to the local distribution of plants in the United States.

Dio Lewis's Monthly. New York: Frank Seaman. 8vo. Price, $2.50 a year.

The author of a number of popular works on health subjects is the editor of the magazine which bears his name, and which is devoted to general hygiene. The three numbers which have thus far been published contain brief items, short dissertations and stories, presenting the ideas in plain language and in an interesting style. Doubtless there is a wide field for such a periodical.

Transactions of the Michigan State Medical Society for the year 1883. Lansing: W. S. George & Co.

The pamphlet contains the minutes, reports and papers read at the Eighteenth Annual Meeting, held at Kalamazoo in May last.

United States Salary List and Civil Service Law, Rules and Regulations; with Specimen Examination Questions in the Custom-House, Post-Office and Classified Departmental Service. Prepared under the direction of Henry N. Copp, Attorney and Counsellor-at-Law. Washington, D. C., 1883. 8vo, pp. 143.

The salary list is an interesting statistical compilation, filling the greater portion of the pamphlet before us. The specimen examination questions show the scope and character of the examinations held under the Civil Service Law.

The Physician's Daily Pocket Record, comprising a Visiting List, many Useful Memoranda, Tables, etc. By S. W. Butler, M.D. Eighteenth year. Philadelphia: published at the office of the "Medical and Surgical Reporter."

The Physician's Visiting List for 1884. Thirty-third year of its publication. Philadelphia: P. Blakiston, Son & Co.

OBITUARY.

PROFESSOR JAMES LAWRENCE SMITH died in Louisville, October 12. He was born in Charleston, S. C., December 16, 1818, and after studying natural sciences at the University of Virginia and in Paris, was for about two years engaged in the geological survey of Turkey. He afterwards resided mostly in Louisville, where he was Professor of Chemistry in the University of Louisville and subsequently engaged in manufacture. About twenty-five years ago the deceased contributed a number of valuable papers to this Journal, mostly on medicinal chemicals; but most of his contributions to science, which related chiefly to analytical chemistry and to mineralogy, were published in the *Chemical News*, the *American Journal of Science and Arts*, and in the *American Chemist;* the more important of these papers were republished about ten years ago, under the title "Mineralogy and Chemistry, Original Researches."

ROBERT F. FAIRTHORNE, PH. G., died in Philadelphia, October 22, after an illness of about three weeks from bilious dysentery, terminating in typhoid fever. He was born at St. Albans Herts, England, came to this country when about fifteen years of age, and learned the apothecary business with the late Bradford Ritter. After graduating at the Philadelphia College of Pharmacy, in 1855, he wrote a number of papers for this Journal, mostly on practical and analytical subjects.

THEOBALD FROHWEIN, PH. G., a member of the New York Pharmacy Board and of the Board of Trustees of the New York College of Pharmacy, died in that city, November 16. The deceased was born in Atzmannsdorf, Thuringia, Germany, and came to this country about twenty-five years ago. He graduated from the New York College of Pharmacy in 1863, and took a deep interest in this institution, serving for many years as its treasurer. He was also a member of the American Pharmaceutical Association and in public life occupied various positions of honor and trust.

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